COLOR VISION

Modern research has established a wealth of information on color vision and developed simple tests for detecting deficient color perception in the individual.*

IN ADAPTING the use of color to many aspects of modern life a whole new science has been developed. Color is now widely employed not only to beautify our surroundings but also to improve seeing conditions, reduce fatigue, and increase safety, efficiency and comfort in work areas. Its value in standardizing signs, signals and markers is universally recognized.

Color recognition, measurement and control are involved in thousands of industrial and commercial processes. Thus the ability to judge color may be an important factor in choosing a career, and tests for color vision early in life are advisable.

The perception of color is a complicated and imperfectly understood function. The specific reaction of seeing that a tree is green involves photochemical, electrical, psychological and other processes. We know that radiant energy from a light source enters the eye, penetrating the transparent cornea, lens and vitreous, and producing a photochemical effect on the retina. There, or in conjunction with mechanisms behind the retina, radiant energy of certain wavelengths, if sufficiently intense, will cause a sensation of light. The color of the sensation depends on many things, including the proportions of the wavelengths involved and the state of adaptation of the eye.

The retina is closely packed with receptors, of which about 130,000,000 are rods and 7,000,000 are cones, a ratio of nearly 20 to one.

The rods give us night vision but no color; only black, white and gray can be distinguished. The adage "In the dark all cats are gray" is descriptive, for in low intensity of light the spectrum appears as a gray band and all hues are lost.

Some idea of the difficulty of studying the mere structure of the cones is suggested by the fact that 50,000 of these receptors are packed into the foveal pit, an area of one square millimeter which is the center of highest visual acuity and color discrimination. Each cone has a separate nerve fiber leading to the optic nerve which carries its message to the brain, and nerve connections with at least two other cones through various types of bipolar cells. All this intricate innervation suggests merely the complexity of the apparatus for color vision without explaining how it works. It is believed that other layers of the retina may act with the cones to give us color vision.

The fovea, the supersensitive center of the yellowish macula, contains no rods. They are distributed thinly toward the middle of the retina and relatively more densely at the sides,

* Grateful acknowledgment is made by the editorial staff of *Sight-Saving Review* to Commander Dean Farnsworth, USNR (MCS), internationally known authority on color vision, for his substantial help in the preparation of this article.

where there are few cones. Rod vision is thus peripheral, so that at night we seem to see objects "out of the corner of the eye." In twilight both rods and cones are active, but discrimination of form and hues is unreliable.

The part of the spectrum to which the normal human visual apparatus responds is from wavelengths of about 380 to about 760 millimicrons. (A millimicron is one millionth of a millimeter.) The following color names are used to describe the hue sensations evoked by the following ranges of wavelength of the spectrum: violet 380–450; blue 450–490; green 490–560; yellow 560–590; orange 590–630; red 630–760.

To the normal eye the brightest part of the spectrum is at 555 millimicrons, a yellowish-green at the center of the range from 540 to 570 millimicrons.

Even persons with normal color vision may show great differences in color discrimination. The Inter-Society Color Council has designed an aptitude test which reveals what a tremendous spread there is in this ability. The average person is able to recognize several hundred different hues. However, there are thousands of gradations of each hue produced by the factors of adaptation, intensity and saturation. Out of this galaxy a highly trained specialist might distinguish as many as 10,000,000 colors. The standards for colors in the pigment range are maintained by Munsell Color Co., from which they may be purchased for experimental and artistic use.

Color Deficiencies

What is called "color blindness" applies only to a complete lack of color vision (achromatopsia), estimated to affect about one person in 300,000. This condition is sometimes called cone blindness since the cones apparently do not function, and only the rods are used for vision. It may be acquired through serious injury or disease, or be inherited as a simple recessive trait, with ten males affected to every seven females. People who live in the black-and-white world of the achromat of course recognize their defect early, and as a rule they show other symptoms: reduced visual acuity, jerky eye movements and sensitivity to light. There is no possibility of cure for this congenital form.

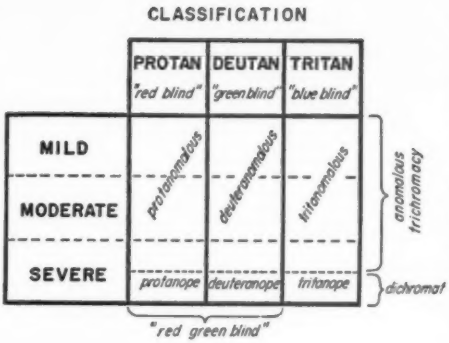
Aside from the completely color-blind persons and those who are completely normal there are the color-deficients. Most of them are red-green confusers, estimated to number between seven and eight millions in this country. Frequently they grow up without realizing their deficiency.

Until recent years there has been no simple way of testing and diagnosing color deficiency. A tremendous amount of work was needed to gather the facts about color vision and organize standards and recommendations needed in our modern society, in which color is so important.

Classification of Defects

A simplified system of classifying color defects has been worked out after years of research. The three types are: protan, deutan and tritan, and these are usually graded as mild, moderate and severe. This system includes all types of color deficiency (exclusive of total color blindness), since all occur as degrees of a specific color weakness.

The red-green confusers include two distinct and separate types—the protans and the deutans. For gross



practical purposes (color coding, signal lights, etc.) they can often be treated together since in general they both confuse greens with reds. There the similarity stops, for a protan will not agree that any particular two colors which are a match to the deutan are a match to him, the protan. In addition protans see reds, oranges and purples as darker than they appear to either normals or deutans. Deutans, the most common type of color deficients, compose the majority of the estimated 10 per cent of the male population and the one female in 200 who have a color defect. In the milder cases they can distinguish reds and blue-greens from gray, but confuse greens and red-purples with gray. In severe cases they can see only various saturations of blue and yellow.

A few unusual cases of the green-weak anomaly in one eye have been found. One subject was entirely lacking in red and green vision in one eye, while the color sense was normal in the other. Thus it was possible to compare the responses of the two eyes and to find out how color vision in the defective eye compared with the nomal.

The tritan type is a blue-yellow deficiency, so rare that less than 20 cases have been recorded with modern methods. Tritans confuse yellows and blues of the same brightness but distinguish reds from greens just as normals do.

Color deficiency of the protan and deutan types which have been described is congenital, a sex-linked trait inherited by males through the mother, who is a carrier if her father was color-deficient. In other words, males inherit the trait from their maternal grandfathers. Women may be color-deficient if both parents were affected, or if the father was color-deficient and the mother a carrier. Males outnumber females in color-deficiency in a ratio of about 20 to one.

Acquired Defects

The types of color deficiency which have been described do not occur as the result of disease, drugs or accidents. Peculiar color perception has been reported in connection with diseases affecting the retina, the optic nerve, or the optic cortex in the occiptal lobe of the brain. It often occurs in multiple sclerosis, pernicious or secondary anemia, leukemia, deficiency diseases caused by severe vitamin lack, and in the optic neuritis of pregnancy. Drug and toxic poisoning such as may be produced by lead, tobacco or alcohol have sometimes been cited as causing color deficiency, but in most if not all such instances the chief problem is severe loss of visual acuity. The chance of curing acquired color deficiency depends on its cause. There is hope of remedy for conditions caused by an injury to the eye or brain which proves temporary in its effects. But when color deficiency is linked to a progressive disease it is rarely curable.

Common Misconceptions

A good many false ideas have grown up around defective color vision, beginning with the term "color blindness," which is a misnomer unless it is used about the rare achromat. Now that the field has been carefully studied, certain other misconceptions can be cleared up.

No correlation has been found between color deficiency and night blindness. It is substantially true that color deficiency does not increase with age; the minor modification to this statement can be accepted that fine color discrimination changes measurably with age in normal color vision and the effects of this age change (usually ascribed to increasing yellowing of the ocular media) would be superimposed on the inherited characteristics. No relationship has been found between color deficiency and visual acuity.

Color deficiency is not correctible by training. Both normals and deficients can be trained to a finer discrimination of colors, and mild deficients may be helped to recognize different intensities of colors, or furnished other clues to help them in ordinary situations.

Color deficiency is not curable. For many years specialists have worked to find remedies for congenital color deficiency, without success. While a fuller knowledge of the mechanism of color vision may suggest new lines for research, at present no deficiency, however mild, can be alleviated, much less cured, unless caused by a temporary, curable disease condition.

During World War II there was a dangerous epidemic of "cures for color blindness," and any national crisis may be expected to produce another army of quacks and enthusiasts competing for fees from color-deficients anxious to qualify for military service. The "remedies" already proved useless include diets, heavy doses of vitamins, electrical treatments, "education" in color naming and color matching, colored goggles, extracts of marigolds, lobsters and cobra venom.

Early Detection

A surprising number of men grow up without suspecting they are color-deficient. The discovery may be made only when this defect has caused a serious blunder or an accident. Since color is being increasingly used in industry, transportation and almost every aspect of daily life, it is essential for young people to be tested for color vision before they choose a career. Some public school systems have pioneered in testing eighth-grade pupils for color vision as part of their vocational guidance programs. The Denver public schools found in the 1957–58 tests of 5,000 pupils that nearly six per cent of the eighth-grade boys and 0.6 per cent of the girls were color-defective. No doubt some of the very mild cases escape detection, but at least a brief screening should be routine in schools.

Choice of Jobs

When young people begin to plan their futures they should be advised to beware of certain types of work if they are even mildly color-deficient. Good color discrimination is required for various tasks in art and decoration, packaging and display, illuminating and electrical engineering, color photography, photoengraving, manufacture of paint and printing ink and ceramics, textiles and paper, and some

lines in the clothing industry. The dress designer, for instance, needs good visual acuity, a normal color perception, and then training and experience in fine hue discriminations. The student should be advised that the choice of medicine, chemistry or biology, and certain business or specialized fields, would entail certain handicaps against which he must always be on guard.

In general, mild color deficiencies do not seriously hinder careers in the above fields. Persons who are more seriously handicapped should be indoctrinated in the nature and dangers of their handicap; methods of compensating by other skills, and discussion of the wide choice of activities in which color perception is not a factor.

Specific industrial jobs where color-coding is important require scrupulous testing and placement. The degree rather than the type of deficiency is significant in most industrial situations. Commander Dean Farnsworth of the Navy, who has made extensive studies in this field, recommends three tests which effectively divide subjects into color-normal or deficient in mild, moderate or severe degrees. Experts agree that it is most unfair to class a person as simply "color blind" or "color defective" unless he is given sufficient tests to distinguish the degree of the defect.

The three successive tests recommended by Farnsworth are: color plates, the Navy lantern and the Dichotomous tests. Those passing all three are rated as normal; those failing the plates but passing the next two tests are mild deficients; moderate deficients pass only the Dichotomous test; and severe deficients fail all three of the tests.

Practical Tests

Illumination. Testing with color plates and the Dichotomous test should be done under lighting from the "Source C" Macbeth Easel Lamp, designed especially for this purpose. The standard tests were validated under this lighting, and unless they are given under the same illumination the results may be unreliable. Standard Daylight has been designated as "Source C" by the International Commission on Illumination and represents the color temperature from an overcast sky.

Pseudoisochromatic Color Plates. The principle of these "confusion" plates is to mingle a symbol or numeral printed in dots of a certain color with a general background of gray or colored dots. These symbols are perfectly plain to the normal eye, but the color-deficient cannot distinguish certain ones.

Recent evaluations made by the Imperial College of Science and Technology, London, and other color authorities have shown that of several simple tests now available the Hardy-Rand-Rittler (H-R-R) and Ishihara (fifth and later editions) pseudoisochromatic plates are the most efficient for rapid screening. The Ishihara is simpler to administer and score, and is particularly well adapted for screening. The H-R-R plates can be used even for illiterates and are well adapted for school use. The outstanding value of the H-R-R plates to schools is that they can be used alone to find a fair approximation of the *degree* of color deficiency in the student.

Lantern Test. The Farnsworth Lantern Test employs the principles used in the Canadian Navy and Air Force

and the British Board of Trade Lanterns. It was designed primarily to certify those who must be able to distinguish colors at a distance under varying conditions of rain, smoke or fog. The lantern presents pairs of red, green and yellowish-white lights simulating distant signal lanterns. Normals and near-normals pass this test and are considered "color-safe" for positions in transportation—marine, aeronautical, and railroading.

Dichotomous Test. Designed by Farnsworth primarily for use in industry, this test fails only the severely defective five to six per cent of an average group of American males who are unable to distinguish the particular code colors used by a given company. It is rapid, and its results are without ambiguity. The task is to arrange in serial order a set of 20 color caps presented to the subject in random order. Normals always set up the caps in a consecutive "normal" arrangement, while severely defective applicants produce a series which is characteristic of protans or deutans.

Minimizing the Handicap

In everything from traffic signals to the wiring systems of factories color coding should be based on the limitations of the 10 per cent of our population who lack normal color vision. The object of such coding is safety, and the "confusion colors" should be avoided. If ordinary red and green glass were used in traffic lights it would confuse both protans and deutans, but for the most part American cities follow American Standards Association recommendations of *orange*-red and *blue*-green which can be distinguished by red-green confusers. It should also be remembered that to the color-deficient contrasts are often less sharp than they are to the normal; contrasting colors used, for instance, to make a piece of equipment stand out against a background may mean little to one man in ten.

Modern research has established such a mine of information on color vision that it is possible for today's society to escape the drabness of former eras without increasing the handicap of those with less than the full color sense.

TESTING EQUIPMENT

Macbeth Easel Lamp. Macbeth Daylighting Corporation, P.O. Box 950, Newburgh, N. Y.; or American Optical Company, Instrument Division, Buffalo 15.

H-R-R Pseudoisochromatic Plates. American Optical Company, Instrument Division, Buffalo 15, N. Y.

Ishihara Color Plates. Takamine Overseas, Inc., 10 East 40th Street, New York 16.

Lantern Test. Macbeth Daylighting Corporation, P.O. Box 950, Newburgh, N. Y.

Dichotomous Test. Psychological Corporation, 522 Fifth Avenue, New York 36.

Books of Color Standards and Colorimetrically Measured Pigments, F-M 100—Hue Test and Dichotomous Test. Munsell Color Co., Inc., 2441 North Calvert Street, Baltimore 18, Maryland.

REFERENCES

Committee on Colorimetry of the Optical Society of America. *The Science of Color.* Thomas Crowell, New York. 1953.

Denver Public Schools. Thirty-third Annual Report, 1957–1958. Health Service Department.

Duke-Elder, Sir Stewart. *Text-book of Ophthalmology,* Vol. 1, C. V. Mosby Company, St. Louis. 1941.

Farnsworth, Dean. *Introduction to the Principles of Color Deficiency.* Report 254,

Medical Research Laboratory, U. S. Naval Submarine Base, New London. 1954.

Farnsworth, Dean. Investigation on Corrective Training of Color Blindness. National Society for the Prevention of Blindness Publication 472. 1947.

Farnsworth, Dean. *Testing for Color Deficiency in Industry.* Council on Industrial Health, American Medical Association, Chicago. 1957.

Hardy, LeGrand H. The Bases of Color Vision. *Illuminating Engineering*, Vol. 36, March 1941.

Hartridge, H. *Colours and How We See Them.* British Book Centre, Inc. New York. 1949.

Inter-Society Color Council. A Symposium on Color Blindness. *Journal of the Optical Society of America*, Vol. 33, No. 6, June 1943.

Judd, Deane B. *Color in Business, Science and Industry.* John Wiley & Sons, Inc., New York. 1952.

Mann, Ida, and Pirie, Antoinette. *The Science of Seeing.* Penguin Books, Ltd., New York. 1946.

Polyak, S. L. *The Vertebrate Visual System.* University of Chicago Press. 1957.

BIFOCALS FOR CHILDREN

Bifocals can help children with several kinds of ophthalmological problems: cases where paralysis of accommodation has occurred after diphtheria and measles with encephalitis, or in brain damage; those instances of esotropia which are greater at a distant focus than at a near focus; and accommodative spasm resulting in intermittent esotropia.

According to a reply to a query in the July 29 issue of the *Journal of the American Medical Association*, the child with subnormal vision may also benefit from bifocal lenses to provide magnification for near vision. Physicians should encourage the acceptance of the lenses by parents, teachers and other children, where indicated.

WHITE HOUSE CONFERENCE

Every ten years during this century there has been a White House Conference concerned with the nation's children and youth. President Eisenhower has designated March 27 to April 2, 1960, as the date for the Golden Anniversary Conference to promote opportunities for young people "to realize their full potential for a creative life in freedom and dignity."

The 1960 Conference is termed a process, rather than five days of meetings—an eleven-year process of earnest study and action that continues over the next decade. About 7,000 delegates will attend.

Many national organizations have a major interest in the program. To date more than 500 have responded to the invitation to participate and are now members of the Conference's Council of National Organizations. Among the chief topics of concern on the part of participating groups are health, education and the handicapped. In all three of these areas the National Society for the Prevention of Blindness and its affiliates have an area of interest. This relates to good eye health for all children and special educational services for those with vision problems.

The National Society will be represented by Helen Gibbons, consultant in education, who has attended all the planning sessions.

The outcomes of the various meetings will provide guidelines for future action. For example, as an outgrowth of the 1950 Conference there have been the intense study of vision screening methods and the setting up of demonstrations of vision screening, particularly among preschoolers.

DARWIN ON THE EYE

JAMES E. LEBENSOHN, M.D.
Chicago, Illinois

On the hundredth anniversary of the publication of Darwin's great work, "The Origin of Species," it is interesting to review his theory on the evolution of the eye.*

CHARLES ROBERT DARWIN was born on the same day as Abraham Lincoln, February 12, 1809. Early in youth he showed a scientific bent and at both Edinburgh and Cambridge he gained the friendship of the scientists there, working with them in off hours.

Shortly after receiving his degree at Christ's College, Cambridge, in 1831, Darwin was invited by Professor Peabody of the University to be the naturalist on H.M.S. Beagle in its surveying cruise around the world. When he embarked in December of that year Darwin was 22 years old.

He returned five years later with the finest collection of animals, plants and rocks ever assembled. At Galapagos he found seven distinct species of finches in the separate islands which he proved were all derived from a single species on the South American mainland. Though this and much other evidence convinced Darwin of the fact of evolution, its mechanism baffled him until in October 1838 he read Malthus on *Population* and the idea of natural selection flashed upon him.

In 1842 Darwin published the journal of his voyage. Sixteen years later A. R. Wallace, then in the Moluccas, sent Darwin a manuscript in which the theory of evolution and natural selection was independently developed. Darwin and Wallace presented their papers jointly before the Linnaean Society in 1858. Darwin's formal work on *The Origin of Species* was published in 1859. During his last forty years he published 17 books, including the famous *Descent of Man* in 1871.

In the sketch of his theory written in 1844, one chapter considers "whether any particular corporeal structures are so wonderful as to justify the rejection prima facie of our theory." Under this heading comes the discussion of the eye, which in *The Origin of Species* finds its place in Chapter VI under "Difficulties of the Theory."

From "The Origin of Species"

"To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree. When it was first said that the sun stood still and the world turned around, the common sense of mankind declared

* Digest of a lecture given before the Chicago Society for the History of Medicine, November 11, 1959.

the doctrine false; but the old saying of *Vox populi, vox Dei*, as every philosopher knows, cannot be trusted in science. Reason tells me, that if numerous gradations from a simple and imperfect eye to one complex and perfect can be shown to exist, each grade being useful to its possessor, as is certainly the case; if further, the eye ever varies and the variations be inherited, as is likewise certainly the case; and if such variations should be useful to any animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable by our imagination, should not be considered as subversive of the theory. How a nerve comes to be sensitive to light, hardly concerns us more than how life itself originated; but I may remark that, as some of the lowest organisms, in which nerves cannot be detected, are capable of perceiving light, it does not seem impossible that certain sensitive elements in their sarcode should become aggregated and developed into nerves, endowed with this special sensibility.

"In searching for the gradations through which an organ in any species has been perfected, we ought to look exclusively to its lineal progenitors; but this is scarcely ever possible, and we are forced to look to other species and genera of the same group, that is to the collateral descendants from the same parent-form, in order to see what gradations are possible, and for the chance of some gradations having been transmitted in an unaltered or little altered condition. But the state of the same organ in distinct classes may incidentally throw light on the steps by which it has been perfected.

"The simplest organ which can be called an eye consists of an optic nerve, surrounded by pigment-cells and covered by translucent skin, but without any lens or other refractive body.

"In the great class of the Articulata, we may start from an optic nerve simply coated with pigment, the latter sometimes forming a sort of pupil, but destitute of a lens or other optical contrivance. With insects it is now known that the numerous facets on the cornea of their great compound eyes form true lenses, and that the cones include curiously modified nervous filaments.

"When we reflect on these facts, here given much too briefly, with respect to the wide, diversified, and graduated range of structure in the eyes of the lower animals; and when we bear in mind how small the number of all living forms must be in comparison with those which have become extinct, the difficulty ceases to be very great in believing that natural selection may have converted the simple apparatus of an optic nerve, coated with pigment and invested by transparent membrane, into an optical instrument as perfect as is possessed by any member of the Articulate class.

"He who will go thus far, ought not to hesitate to go one step further, if he finds on finishing this volume that large bodies of facts, otherwise inexplicable, can be explained by the theory of modification through natural selection; he ought to admit that a structure even as perfect as an eagle's eye might thus be formed, although in this case he does not know the transitional states. It has been objected that in order to modify the eye and still preserve it as a perfect instru-

ment, many changes would have to be effected simultaneously, which, it is assumed, could not be done through natural selection; but as I have attempted to show in my work on the variations of domestic animals, it is not necessary to suppose that the modifications were all simultaneous, if they were extremely slight and gradual.

"Different kinds of modification would, also, serve for the same general purpose; as Mr. Wallace has remarked, 'If a lens has too short or too long a focus, it may be amended either by an alteration of curvature, or an alteration of density; if the curvature be irregular, and the rays do not converge to a point, then any increased regularity of curvature will be an improvement. So the contraction of the iris and the muscular movements of the eye are neither of them essential to vision, but only improvements which might have been added and perfected at any stage of the construction of the instrument.'

"Within the highest division of the animal kingdom, namely, the Vertebrata we can start from an eye so simple that it consists, as in the lancelet, of a little sack of transparent skin, furnished with a nerve and lined with pigment but destitute of any other apparatus. In fishes and reptiles, as Owen has remarked, 'the range of gradations of dioptric structures is very great.' It is a significant fact that even in man, according to the high authority of Virchow, the beautiful crystalline lens is formed in the embryo by an accumulation of epidermic cells, lying in a sack-like fold of the skin; and the vitreous body is formed from embryonic sub-cutaneous tissue. To arrive, however, at a just conclusion regarding the formation of the eye, with all its marvellous yet not absolutely perfect characters, it is indispensable that the reason should conquer the imagination; but I have felt the difficulty far too keenly to be surprised at others hesitating to extend the principle of natural selection to so startling a length.

"It is scarcely possible to avoid comparing the eye with a telescope. We know that this instrument has been perfected by the long-continued efforts of the highest human intellects; and we naturally infer that the eye has been formed by a somewhat analogous process. But may not this inference be presumptuous? Have we any right to assume that the Creator works by intellectual powers like those of man? If we must compare the eye to an optical instrument, we ought in imagination to take a thick layer of transparent tissue, with spaces filled with fluid, and with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing slowly in density, so as to separate into layers of different densities and thicknesses, placed at different distances from each other, and with the surfaces of each layer slowly changing in form.

"Further we must suppose that there is a power, represented by natural selection or the survival of the fittest, always intently watching each slight alteration in the transparent layers; and carefully preserving each which, under varied circumstances, in any way or in any degree, tends to produce a distincter image. We must suppose each new state of the instrument to be multiplied by the million; each to be preserved until a better one is produced, and then the old

ones to be all destroyed. In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might thus be formed as superior to one of glass, as the works of the Creator are to those of man?"

Discussion

Darwin stressed that vision resulted from a continuous adaptive response to light and that any favorable mutation, however subtle and minute, gave its possessor a better chance for surviving the challenges of environment. The evolution of sight is no more wondrous than that of flight which progressed from gliding to annual distant migrations.

The simplest protozoa exhibits a surface photosensitivity that steers the organism to its optimum environment. In the ameba this is attributed to a change in viscosity of its outer layer. The photomotor response increased in efficiency with the successive evolution of specialized light-sensitive cells in the anterior part of the organism, the addition of insulating and sensitizing pigments, and of focusing devices to concentrate the light. In both plant and animal kingdoms the light-sensitizing pigment is derived from caretenoids. The derivative vitamin A systems, essential for image formation, are similar in eyes as widely diverse as those of man and the octopus.

In invertebrates, the retina, derived from the surface ectoderm, is connected secondarily to the nervous system. In vertebrates, however, the eyes arise from the neuroectoderm and a multi-layered retina assumes the function of the invertebrate optic ganglion. Though the vertebrate retina is always inverted and the invertebrate retina is usually erect, inverted retinas are seen in six of the spider's eight eyes and in the eyes of the scallop.

Ray Lankester (1880) suggested that the original pre-vertebrate eye was buried in the central nervous system as in the larval seasquirt, a proto-chordate. He assumed that light traversed the transparent body and that as the body became more opaque with the progress of evolution, the eye travelled gradually to the surface. The transparent media of the eye retain the primitive transparency. The cornea, for example, resembles the integument of Amphioxus.

The neural tube had to come into being before the vertebrate retina could evolve. A suggestion of its incipiency is the median infundibular organ of Amphioxus, considered by Walls to be derived from photosensory ependyma. The rods and cones have been traced to the flagellae of ependymal cells, a conception that brings them in line with sensory hair cells in general. The course of evolution intimates that the cones are the older form since diurnality was the primitive status of vertebrates. The lens, as shown by experimental embryology, is a secondary structure called forth by a chemotactic response to the developing optic cup. The semi-solid vitreous first served to prop the lens in place, as the eye of the lamprey demonstrates. Diverse methods of effecting accommodation are illustrated

in the fish, bird, horse and man. The fibrous and vascular coats of the eye are probably modifications of the meningeal envelopes—the dura mater and pia arachnoid respectively.

The pupil, fixed in lampreys and fishes, attains maximum motility in mammals. The rapid equalizing device of an active iris displaced the photomechanical changes of pigment migration employed by the retinas of primitive forms. With evolution the acuity requirements steadily increase. Consequently in man the posterior segment becomes larger so that the visual cells are more numerous per angular unit of image, and the lens becomes flatter to be adapted for the greater focal distance. In the rabbit the depth of the vitreous chamber is less than the anterior-posterior diameter of the lens; in man it is about three times as great.

An outstanding feature of the evolution of the Primates is the progressive elaboration of the sense of vision. In the higher Primates the orbital apertures become directed forwards and stereoscopic vision is developed as a distinctive acquisition. The orbit becomes protected by a complete ring of bone and is almost entirely shut off behind a bony wall. This closing in favored steadiness of ocular motion.

The most marked trend in the evolution of man has been the special development of the brain. To quote Walls: "Human vision is the product of a complex brain teamed with a relatively simple eye."

WORLD WAR ON GLAUCOMA

An international arsenal for the battle against glaucoma was strongly advocated by the late Dr. M. E. Alvaro of Sao Paulo, Brazil. The first weapon was forged in Brussels during the International Congress of Ophthalmology in September, 1958 when the International Society for the Study of Glaucoma was organized. Dr. Alvaro discussed the objectives of the new organization in the *Journal of Social Ophthalmology*, first quarter, 1959. It will collect and appraise world literature on glaucoma, and act as a clearing house of information for students of the subject.

Dr. Alvaro said that while knowledge is the best armamentarium to combat the disease, and more knowledge is required, a lot can be achieved in a practical way even with what already is known.

This involves making the adult population of the world aware of the insidious disease, and alerting ophthalmologists to the importance of proper field taking and adequate tonometry in the routine examination.

The general practitioner should be educated through articles in medical journals to recognize the symptoms and dangers of glaucoma, especially the potential blindness. A glaucoma-conscious general practitioner would be prepared to make referrals to an ophthalmologist when necessary.

The general public should be better informed about the disease by articles in the popular media, programs on radio and television and well-organized "glaucoma weeks."

Such a world-wide and varied attack on one of the major causes of blindness should yield good results.

CAUSES OF BLINDNESS IN PUERTO RICO

GUILLERMO PICÓ, M.D., MANUEL N. MIRANDA, M.D.
JAIME E. IRIZARRY, M.D., and CARLOS E. MORALES, M.D.
Santurce, Puerto Rico

Data available for the first time provide a basis for planning a prevention program, with improved facilities for sight restoration.*

DATA concerning the causes of blindness in any country or community are of far more than statistical value. With this information it is possible to set up programs for the prevention of blindness, and also to rehabilitate many persons who are classified as blind but who can recover their vision under adequate treatment.

Up to this time data on the causes of blindness in Puerto Rico have not been available, and the analysis which we are presenting is therefore of unusual interest and importance. The report covers 2,656 blind persons registered in the division of public welfare of the Department of Health in the period 1950–1957 inclusive. All blind persons who desire to receive economic aid must register with this division. The data are undoubtedly representative of the general situation in this country. Presumably the 2,656 represent 75 to 80 per cent of the blind population, since approximately this percentage of the total population is considered indigent, the income per family being less than $2,000 per year.

The definition of blindness applied to each case record is the one commonly used in the United States: vision of 20/200 or worse in the better eye after correction; or limitation of the field of vision to 20° or less in the maximum diameter.

The analysis of the diagnostic information obtained from the study of the individual records was based on the classification of the causes of blindness accepted in 1950 by the International Association for the Prevention of Blindness[1] and revised in 1957 by the United States Committee on Statistics of the Blind.[2] These criteria furnish a dual classification in which the two elements of the diagnosis, the topographic factor (site and type) and the etiologic factor, are listed and utilized separately.

The age range in these 2,656 blind persons was from one month to 99 years. Seventeen per cent were under 20 years of age; 19 per cent, 21 to 39; 54 per cent, 40 to 64, and the remainder 65 and over. The age incidence, it is scarcely necessary to point out, is of great importance in both topographic and etiologic factors. The longer the span of life, the greater will be the incidence of cataracts and other degenerative diseases as well as of such conditions as glaucoma.

The lens was affected in almost half

* From The Section of Ophthalmology, University of Puerto Rico School of Medicine and the Service of Ophthalmology, San Juan City Hospital. Digest of a paper presented at the Annual Meeting of the Puerto Rico Medical Association, Santurce, Nov. 1958.

of the 2,656 cases of blindness, the diagnosis in most instances being cataract. The whole eye was affected in the next largest number, with glaucoma the leading single cause.

When the topographic factors brought to light in this analysis in Puerto Rico are compared with those reported by Foote and Berens in their comparative analysis of recent studies of the registered blind in New York, Wisconsin and New Hampshire,[3] it is immediately apparent that diseases of the lens, chiefly cataracts, account proportionately for twice, or more than twice, as many cases of blindness in Puerto Rico as in any of these three states.

The reason, unfortunately, is clear. It is found in the long lists of patients awaiting cataract surgery which cannot be performed promptly because of the very limited number of beds available for ophthalmology in the public hospitals of Puerto Rico. A careful review of the records has convinced us that of the 1,218 patients blind because of cataracts, at least 977, well over three-quarters of the total, could be cured or could have their sight improved by cataract surgery.

If more beds and other facilities were made available these patients could obtain enough vision to permit them to lead useful lives in the community. As an entirely practical consideration the cost of providing these facilities would be less, particularly when their long-term usefulness is taken into account, than the cost of long-term financial aid to these blinded persons.

Unspecified factors or those for which science has not yet found an explanation accounted for more than

TABLE I

Classification of Causes of Blindness by Topography in 2,656 Blind Persons in Puerto Rico 1950–1957 Inclusive

Site and Type	Percentage of Cases
Eyeball in general	29.44
Cornea	4.75
Crystalline lens	46.35
Uveal tract	6.47
Retina	3.74
Optic nerve, pathway, and cortical visual centers	10.27
Vitreous	0.00
Not specified	.076

half of these 2,656 cases of blindness. This proportion, 57 per cent, is practically the same as the figures for New York and less than those for Wisconsin and New Hampshire. In the Puerto Rico studies the inclusion of cataracts in this category may be assumed to account for the magnitude of the proportion. In the United States studies the proportion of cataract cases was less, but there the larger numbers of persons living to age 65 and over account for higher proportions of other degenerative diseases and of glaucoma which fall into the categories for which science has yet to find a cause.

Analysis of these Puerto Rico records indicates that the proportion of cases in the category of blindness due to infections must be accepted with reservations. Many of the persons in this category who were registered during the 1950–1957 period had sustained their loss of sight years before, when antibiotics were not available and when medical attention could not be procured as readily as today. The records also indicate that the ophthalmologists who examined these registrants often had difficulty in obtaining

adequate histories concerning the origin and course of the original condition. We have little doubt that in a fair number of these cases the physicians, since they saw only the end results, classified the blindness as of infectious origin when such conditions as nutritional deficiencies or general diseases might have been the real cause.

Future studies will probably show a marked decrease in the percentage of blindness due to infections in Puerto Rico, where the present study indicates that this cause accounts for a considerably larger proportion than it does in the cases registered in New York, Wisconsin and New Hampshire. It is also possible that the proportion should be considered only relative, since the percentage of cases attributed to general diseases, such as diabetes, as well as the percentage attributed to injuries and poisonings, is so much lower than in the cases studied in New York, Wisconsin and New Hampshire.

Similar conclusions may be possible in respect to the high proportion of blindness attributed to prenatal and hereditary factors in Puerto Rico. The proportion is considerably higher than in the states mentioned.

In a recent report concerning their further experience with the standard classification of blindness, Berens and Foote[3] presented a comparative tabulation of topographic and etiologic studies of blind persons in Canada, El Salvador and New York State.

When the findings in Puerto Rico are added to these data the comments just made seem equally applicable. It is difficult, however, to explain the high proportion of blindness from glaucoma (60 per cent) and the small proportion from cataracts (3 per cent) in El Salvador. It may be, as Foote and Berens speculate, that the data are somewhat slanted, in that many of the reports might have come from a hospital and been made by an ophthalmologist with a particular interest in glaucoma. In other words, the observations may have covered a relatively larger number of persons who had lost their sight from this condition than would be found in the general population. However objective one attempts to be, the personal equation cannot be entirely eliminated in any such study.

Conclusions

Two important conclusions are derived from this study:

It is highly significant that cataracts account for 46 per cent of the blind registrants in the division of public welfare of the Department of Health of Puerto Rico between 1950 and 1957 inclusive. This is a condition which in the majority of cases is curable by surgery or in which improvement can be accomplished by surgery. A case-by-case analysis indicated that this was true in more than 75 per cent of

TABLE II

Classification by Etiologic Factors in 2,656 Blind Persons in Puerto Rico 1950–1957 Inclusive

Cause	Percentage of Cases
Infectious diseases	19.39
Trauma	.648
Poisonings	.114
Neoplasms	.114
Diseases not elsewhere classified	.452
Prenatal influence not elsewhere classified	22.88
Etiology undetermined or not specified	56.66

these patients. It is therefore urgent that additional hospital beds and other increased facilities for ophthalmology be made available in the public hospitals of Puerto Rico.

Genetic factors involved in serious hereditary eye conditions must be studied more intensively, which means that the family history should be traced in every such case. With the correct data available, advice could be given to prospective parents, and the reproduction of children with these defects could be avoided.

REFERENCES

1. Berens, C.; Kerby, C. E., and Foote, F. M. Nomenclature and Classification of the Causes of Blindness. Acta of the 16th International Congress of Ophthalmology, 1950. p. 1477.
2. Revision of the Standard Classification of Causes of Blindness. *Sight-Saving Review* 27:112. Summer 1957.
3. Foote, F. M., and Berens, C. Further Experience with the Standard Classification. Report to the International Congress of Ophthalmology, 1958. Brussels.

TRACHOMA DOCUMENTARY

A colorful new film made in a village at the foot of the Atlas mountains instructs in the nature and treatment of trachoma. "Open Your Eyes" shows how the government of Morocco has joined forces with WHO and UNICEF to rid the country of the disease.

The film tells about trachoma through the story of Ali, a young Moroccan boy whose father has been blinded by the disease. Ali joins a team that travels from village to village fighting trachoma. The schools, where teachers know how to apply the antibiotic that cures trachoma, help fight the scourge by teaching the lesson that the disease must be fought in time or blindness will follow.

While the film will have application only in certain sections of the United States it is an inspiring subject, simply presented. It might be used to demonstrate what can be done effectively under primitive conditions and with minimum expenditure. It should serve to stimulate prevention of blindness groups to attack their problems with greater enthusiasm.

"Open Your Eyes" may be purchased from the Center for Mass Communication, Columbia University Press, 1125 Amsterdam Avenue, New York 25. Price $100 in color; 15 minutes running time. For rental a film library should be consulted.

TRIBUTE TO DR. CORDES

A special number of the *American Journal of Ophthalmology* (May 1959, Part II), has been dedicated to Dr. Frederick C. Cordes of San Francisco, chairman, department of ophthalmology, University of California School of Medicine. This issue was dedicated to Dr. Cordes on the occasion of his 67th birthday and his retirement from the faculty. He has been department chairman since 1934 and a member of the U. C. Medical Center staff since earning his M.D. degree there in 1918. The issue contains tributes to Dr. Cordes' accomplishments in medical education and the study of eye diseases by several distinguished associates.

Dr. Cordes has been a member of the NSPB board of directors since 1955 and has given outstanding service to the Society as a member of its research and glaucoma committees. He has been co-chairman of the professional advisory committee of the California Chapter for nine years.

Medical Aspects of Reading Failures in Intelligent Children

GEORGE E. PARK, M.D., M.S.
Chicago, Illinois*

The problem of reading disability has many ramifications, extending into the physical, psychological and social fields.**

AMERICAN educators are becoming increasingly concerned about children who fail in reading. An awareness of the dilemma should stimulate other branches of science, particularly psychology and medicine, to help determine and understand more fully the reasons for the great number of children and adults with reading disabilities. Also, parents must realize the roles they play in this situation. It is through such understanding and multidiscipline cooperation that new ways of dealing with the problem will be developed.

The term dyslexia defines a syndrome which is characterized by an inability to learn to read properly even though the individual's intelligence is normal or superior. Dyslexia cannot be considered as a simple reading disability. There are many ramifications extending into the physical, psychological and social fields as well. Abnormal factors which are associated with dyslexia are functional, and correctible in approximately 85 per cent of the cases, in contradistinction to alexia, which is due to brain injury or lack of intelligence.

Developmental Considerations

In the entire syndrome one must investigate also the development of personality and emotional maturation and stability, the hereditary traits, and especially the environment in which the child lives. Occasionally dyslexia is found in successive generations of the child's ancestors. This should not be interpreted as an inherited trait, for it is likely that the characteristic environment has been experienced from one generation to the other. Before we ascribe dyslexia to genetic origin per se it is necessary to eliminate all peripheral and functional disorders. There is nevertheless a possibility that heredity may occasionally contribute circumstances that predispose to dyslexia. Acceptance of the hereditary concept would be disastrous, for then the parents, teachers and particularly the child would consider the condition hopeless and treatment would be doomed to failure.

Caution should be a paramount consideration in the administration and interpretation of a psychological

* Department of Ophthalmology, Northwestern University; Department of Clinical Science, University of Illinois; Staff Ophthalmologist, Dyslexia Memorial Institute, 339 E. Chicago Ave., Chicago.

** Digest of a paper presented at the joint meeting of the American Public Health Association and the National Society for the Prevention of Blindness; St. Louis, October 30, 1958.

test. Accepting or implying that because children's I.Q.'s have been reported as such without knowing the qualifications of the examiner is fraught with danger. Experience has shown that if the abilities of a child are rated too high or too low, teachers, parents and especially the child adopt compensatory methods with disastrous effects. Intelligence is not an innately acquired static quotient. It is a dynamic progression influenced by past experiences, motivations and the psychophysiologic needs and stimulations of the individual at any particular time. Actually the psychological determination of the I.Q. is an estimate of the individual's potential. It is the differential between the potential and the achievement of the dyslexiac child which we are now considering.

Reading is a complex achievement. The more intelligent a person is, and the more perceptual experience he has encountered, the more quickly he should learn from abstractions and symbols. The degree to which normal or abnormal functions influence the process of learning as a whole depends upon the individual's ability to maintain homeostasis in response to the psychophysiological stimuli that are imposed upon him. The degree of this homeostasic stability and adaptation depends on the degree of normality in all the diverse functions that are involved in the reading processes, including the central perceptual and conceptual processes as well as the entire peripheral ocular mechanism in all its complexity.

Medical Factors

Only brief mention can be made here of some medical factors which we have found associated with dyslexia. First let it be understood that there are many complexly interrelated determinates which make it hazardous to assign a single causative factor to reading disability. All possible factors are involved—physical, psychological and educational. These do not act separately but as an integral in an environmental field to which, in turn, the individual reacts as a whole.

It is singular that the ratio of failures in reading is approximately four times as many boys as girls. What are some of the factors which may influence such an uneven distribution of cases? This question cannot be answered with finality but it is ripe for speculation. One could suspect an hormonal connection. Furthermore, apparently boys are more aggressive and rebellious than girls. When children enter school reading and learning can become a sublimation of the aggressive drive; and should this sublimation become thwarted, it is possible that dyslexia becomes a corollary.

Influence of Endocrines

As reviewed by Ivy and Krasno it is generally conceded that the endocrines, especially the thyroid gland, are influences in the maintenance of the intellectual functions and normal personality.

One of the most remarkable facts which experimental and clinical research determines in humans is that the optimum effects of the thyroid functions or medication upon mental growth occur before eleven or twelve years of age, and that administration of thyroid extract is almost futile after that age as far as mental growth is concerned. On the other hand, individuals who develop a hypothyroid condition subsequent to the full growth

and maturation of their nervous systems do not manifest a true mental deficiency although they may become dull and physically sluggish, whereas the hyperthyroid is irritable, jumpy and may be emotionally unstable. Adequate medication may change these states and make the hypothyroid patient more responsive and the hyperthyroid less reactive.

In our study 27 per cent of the children had hypothyroidism and four per cent had hyperthyroidism, to a degree where therapeutic intervention was indicated. A few showed definite pituitary imbalances.

Reaction to Stimuli

Reflexes are suggestive of the status of the nerve reactions to stimuli. As ideas and learning are basically the reaction to perceptual experiences arising from sensations, both motor and sensory, abnormal reflexes influence the individual's ability to respond normally to sensations.

A source of confusion is the lack of awareness of our abstractions and projective processes. As an example, use can be made of a stereoscope with a white card viewed by one eye and a black area before the other eye. These are superimposed by fusion. The resulting color is interpreted as silvery gray. In identifying one level of abstraction from another the term silvery gray does not refer to the color on the card, as is so often naively assumed. Instead, it refers to the abstract determined by the individual's nervous system. In our cases 15 per cent had sluggish reflexes, while 11 per cent had exaggerated reflexes. Jerking of head, twitching of face or other choreic symptoms were present in six per cent.

Electroencephalogram Results

A preliminary analysis of the EEG's seems to indicate a tendency toward certain changes, but precise opinions have not been formed. However, approximately 50 per cent of the children had borderline or mildly abnormal EEG records, none severely abnormal. The most commonly observed borderline record was the unusually low build-up of voltage and slow waves during hyper-ventilation. Although this occasionally occurs in normal children, it occurred in approximately 30 percent of dyslexiac children. This is an observation which we shall pursue further. Some mild electrical alterations from normal rate or amplitude occurred in the parietal lobe of the brain in approximately 20 per cent of these children. However, once again care must be exercised in the interpretation of these data since parietal asymmetries can occur in normal children.

Bone Maturation

Using as a criterion the carpal bone growth as standardized by Todd, eight per cent of the dyslexiac children show retardation in the chronological physical maturation. Some authorities believe that reading failures are due to this slow process. In a limited number of cases this may be the predisposing etiology, associated with other factors.

Blood Condition

A comparison was made of the blood counts of 200 dyslexiac children with the standardized values established by Albritton. By correlating the number of circulating blood cells per cubic millimeter it was found that the erythrocytes were equal in the dys-

lexiac and standardized values. In the differential leucocyte count there was a variance. The number of circulating lymphocytes corresponded with the standardized values, but there was a 27 per cent lowering of the normal differential for neutrophils. We are now carrying on a control study of this aberration to eliminate any possibility of an artefact.

Emotional Factors

The influence of a disturbance of interpersonal home and school relationships must be a primary concern of any person involved with the care of a child with reading failures. The incidence of enuresis in our patients has been 18 per cent, i.e., they gave a history of having had it, or it was still persistent.

When we consider that emotional factors are implicated as the outstanding cause of this condition, and that such factors are related to the stability or instability of parental figures and home environment we must not overlook them, whether or not the child has enuresis. It should be stated that enuresis is not felt to be a symptom of reading difficulty nor is reading difficulty secondary to enuresis. In many instances they are both symptoms of an emotional conflict which involves interpersonal relations with parents and siblings. The child may be reacting unconsciously to overstrictness, or to inconsistent firmness in the family situation. It has been interesting to observe the correlation between the problem of enuresis and the neuropathic features of nail biting, thumb sucking, feeding difficulties and temper tantrums.

A fear of loss of parental love develops in the child when it fails to measure up to the parents' expectations. That fear is often reflected in overcompensation to be a "good" child and please its parents while awake. However, when the child goes to sleep, confused feelings are released in night terrors, bad dreams and enuresis. As this condition is usually a corollary to other symptoms of personality disturbances, which are present almost without exception in dyslexiac children, it is well to look for excessive goals and standards, undue amount of criticism, or unfavorable competition. The home should be a place of security, serenity, encouragement and affection. Ideally, from the child's vantage point, the parents must personify all things that are good and wholesome.

Hearing and Speech

Hearing is such an essential factor in language function that a detailed examination is most important. Acute otitis media is usually the cause for diminution of hearing. This may accompany an acute or chronic infection of the nasopharynx as evidenced by hyperplasia and inflammation of the tonsils, adenoids, turbinates or hypertrophied lymphatic nodules on the posterior pharyngeal wall. Furthermore, as evidence of the severity of the early diseases of childhood which our patients had experienced, 14 per cent gave a history of having had abscessed ears.

If a child cannot hear properly the influence upon spelling achievement is particularly noticeable, for he misinterprets oral instruction and seems to become willfully heedless. Such a child may appear stubborn, indifferent, "dumb." He eventually becomes an extreme introvert as he withdraws

from social contacts. It is necessary that communications and directions, given by parents and teachers to a child with this handicap, be heard and understood. Care should be taken to seat him to best advantage in the schoolroom.

Whereas vocalization is the means by which most of our ideas and instructions are expressed, and since it is so closely related to hearing, one must consider the physical development and flexibility of the vocal organs and the ability to coordinate and control them during the production of speech sounds. Nine per cent of our series were late in learning to talk. Many children who are unstable emotionally show a blocking when required to read either silently or orally. Some of our cases have become so emotionally upset and frustrated that their voices were tremulous, their faces pale and nervous, with visible twitching. It is quite evident that no one, however expert, could teach a child in that state of homeostasis.

Visual Function

It is customary to accept the concept that reading is simply seeing words, phrases and sentences. If it were as simple as that the visual processes would be practically the predominant factor in dyslexia. When a discussion of this problem is begun with most people they remark that "it must be due to eye trouble." Actually only 19 per cent of our cases need spectacles. We have removed many pairs of glasses which had been prescribed empirically to aid the patient with his reading. Such prescription should be frowned upon when glasses are not necessary, for some of the children had a high degree of exophoria which was aggravated by the convex lens.

Fifteen years ago the number of investigations and publications dealing with the controversial question of dominance, eyedness, handedness and footedness was considerably greater than today. In our experience these functions are not significantly related to reading ability.

Weak duction reserve, coincident with convergent insufficiency or accompanying accommodative or convergent spasm, has been present in many patients, causing undue fatigue.

Dyslexia cases were inferior in their ocular function to that of the norms where rate of reading, number of fixations, regressions and span of recognition were considered.

Other erroneous ideas about causes of reading difficulties relate to strephosymbolia and mirror vision. These are apparently self-imposed psychological processes, maybe accidental at first, but with definite significance when analyzed in relation to the aspirations and motives of the child. He may use them as a means of getting attention, or as an escape, believing that if other people think he has a rare malady he will not be required to learn to read.

In our experience we have found no cases of typical mirror reading. Several of the children were using these mental gymnastics when we first saw them. One began to write his name and 3's, 5's and 7's backwards. A presumed authority had spent two hours explaining to the mother how the function of the right hemisphere of her son's brain had been transplanted to the left hemisphere, and vice versa. Naturally, the mother was extremely apprehensive. Our concern was to find the reasons why the boy

was using this excuse and technique for not learning in school. We did. He gained one year in reading within six months. Why not? He had an I.Q. of 136. He also stopped his monkey business.

Another boy had used this type of mental gymnastics in school for five years. Even on his first visit to the Institute he drew a picture of a cat standing on its head on a broomstick. When asked why he had drawn the picture thusly his answer was: "I wanted to show the cat with his feet on the broom handle. Something happens to my brain that no one can explain so I don't know why the feet aren't on the broom handle." He also described seeing things upside down in past years, saying, "I would see spots before my eyes and these would be upside down." He cleared up also with careful educational management.

Now, in brief, it would be erroneous to take the peripheral ocular mechanism habits as the standard and the visual acuity as the determinant of cerebral action or perceptual processes. It is also inconclusive to take mental processes as the sole factor influencing the modus operandi of peripheral ocular performance. Since the roles are probably interchangeable, it would be difficult to determine which acts as the originator and which the compensator. All available faculties plus the desire to achieve the universal concept are probably integrated in the processes of learning.

The final goal in attacking reading difficulty is to get the child to read for himself, for pleasure.

A Report on Cataracts

At the request of the Pennsylvania Medical Society's Commission on Conservation of Hearing and Vision, a survey of ophthalmological reports for blind pension was conducted by the Office for the Blind in the Department of Public Welfare, the purpose being to collect data pertinent to the incidence of cataracts and the frequency of recommendation for surgery by the examiner.

Pauline M. Sweigart, remedial eye care consultant, Office for the Blind, reports that a district embracing 16 counties in Pennsylvania was selected for the survey. The geographical area represents a typical cross-section of population in the state, including the third largest city in Pennsylvania and perhaps the smallest of villages. Medical services available within the territory run the gamut of facilities from private office care to state hospitals and community clinics. Three counties—Pike, Sullivan and Wyoming—have no ophthalmologist within their borders, while others, such as Berks and Lackawanna, have fine facilities and many competent ophthalmologists available for medical service.

Examination of Reports

All ophthalmological reports for a determination of pension sent to the Wilkes-Barre District Office for the Blind between June 1 and December 31, 1958 were examined. Of a total of 392 reports 288 showed eye examination by a medical doctor; 104 by an optometrist. Aphakic vision was indicated in 56.

Cases in which there was a diagnosis of cataract totaled 242. Surgery was recommended in 74; advised later in 7; examination justified no surgery in 48; client rejected it in 25. Surgery was pursued in 6 cases.

Because of the variables that affect these statistics the findings should be evaluated with the following considerations: The exclusive use of clinic facilities in certain areas and the variance in interchange of data on patients in clinic settings affects the findings. A multi-agency coordination on follow-up affects the information available. The reasonable period of time between the case-worker contact and the client motivation which impels action is not obvious in the findings.

Conclusions Drawn from Study

Conclusions which can be drawn from the findings give impetus to further study and exploration of eye medical services available.

Cataract continues to be the leading cause of blindness. Sixty-two per cent of all persons examined for blind pension had a diagnosis of cataract.

Thirty per cent of all persons with cataract were recommended for surgery. Considering that emphasis was made on this factor in a previous survey, there is assurance that education and focus produce desirable changes.

On the premise that certain persons are inoperable, 20 per cent of all reports with a diagnosis of cataract showed that examiners clearly identified the patients who should not pursue surgery.

Fourteen and one-half per cent of all persons in this review showed that cataract surgery had been previously undertaken, resulting in aphakic vision in one or both eyes.

The greater majority of persons examined for blind pension are provided with an ophthalmological evaluation.

The reasons given by the client for not wanting surgery were real and tangible. Age and health were predominant reasons while fear of losing total vision, lack of supportive recommendation from the general practitioner, and contentment with status as a blind person were other acknowledged reasons.

WINIFRED HATHAWAY AWARD

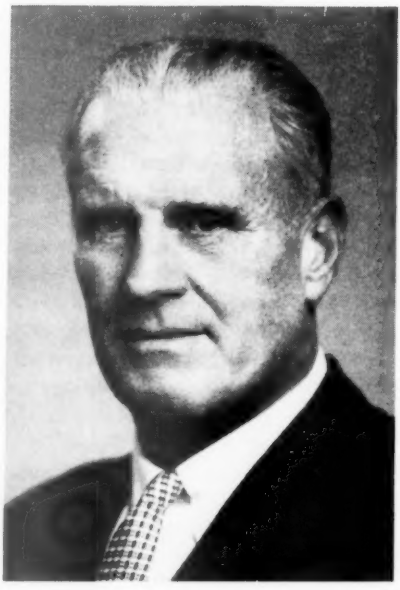
A Winifred Hathaway Award to honor teachers who have made outstanding contributions to the education of partially seeing children has been established by the National Society. To be made annually, the award is in recognition of Mrs. Hathaway's leadership in providing special educational facilities for these children. She served as associate director of the National Society for 24 years and is internationally known as the author of "Education and Health of the Partially Seeing Child."

Each state commissioner or superintendent of public instruction has been invited to nominate a "teacher of the year" in this field, and from the list of nominees the national awardee will be chosen by a committee of educators. She will receive $250 and a certificate of honor.

Presentation of the national award will be made at the Annual Conference of the National Society to be held in Denver, Colo., March 30-April 1.

Teachers selected in the various states, but not named for the national award, will be given certificates of recognition by the National Society.

ENOS CURTIN NAMED PRESIDENT OF THE NATIONAL SOCIETY



ENOS CURTIN was elected president of the National Society for the Prevention of Blindness at its annual meeting held in New York on December 10. He succeeds Ira V. Hiscock, Sc.D., recently retired chairman of the Public Health Department at Yale University.

Mr. Curtin, investment banker of New York City, has been a member of the Society's board of directors since 1957, and a member of its executive committee for the past year. He is president of the Ophthalmological Foundation, a member of the board of the New York Association for the Blind, a trustee and member of the executive committee of St. Barnabas Hospital, and a director of Madison Square Garden.

Mr. Curtin is also a director of the Graham-Paige Corporation, American and Foreign Power Corporation and Fall River Electric Lighting Company. He was director of operations of the Marshall Plan and also served as consultant for the National Production Authority, U. S. Department of Commerce, and the Defense Production Administration.

Dr. Hiscock, one of the nation's leading authorities on public health, has long been closely affiliated with the National Society and has contributed invaluable service in many areas of its work. He has been a member of its board of directors since 1938, and of its executive committee since 1941; was a vice-president from 1950 to 1952, and was elected president in 1958.

Dr. Hiscock was president of the American Public Health Association 1956-1957 and is a past president of the National Health Council. He is a member of the Expert Panel on Public Health Administration of the World Health Organization of the United Nations. He is well known for the many public health surveys he has made of cities and states.

For the next six months Dr. Hiscock will serve as Carnegie Visiting Professor in public health at the University of Hawaii. He will spend the balance of 1960 in Honolulu doing a study on the teaching of public health

to doctors, nurses, engineers and others in the Pacific area, as well as in the Near East and Far East.

New Board Members

New members of the National Society's board of directors elected to serve for a period of three years are:

Mrs. Dorothy Bryan, assistant to the director, division of special education, blind and partially seeing, State Department of Public Instruction, Springfield, Illinois.

Ralph E. Dwork, M. D., M.P.H., director of health, Ohio Department of Health, Columbus.

Edward R. Granniss, manager, loss prevention and engineering department, Royal-Globe Insurance Group, New York.

Mrs. Ronald J. Foulis, chairman, Delta Gamma Fraternity Project on Sight Conservation and Aid to the Blind, Washington, D.C.

Frank W. Newell, M.D., professor of ophthalmology, University of Chicago, and secretary, National Committee for Research in Ophthalmology and Blindness.

Report of Executive Director

In his report to the board of directors Dr. John W. Ferree, executive director, expressed satisfaction over the opportunities for constructive service which are open to the National Society. Since joining the organization in September, he said, he had been impressed with the excellent program that had been bequeathed to him—one that enjoys the widespread respect, interest and support of all segments of the population.

Dr. Ferree outlined some of the problems and challenges that face the Society in the areas of research, professional and public education and information, preventive service, and supportive activities, as a basis for action in the coming months.

Report on Research Project

At the annual membership meeting of the Society on the same day Dr. Goodwin M. Breinin of New York University Post Graduate Medical School gave a report on an important research project which the Society has been supporting for the past two years. This relates to the development of a method for maintaining corneas for an extended period of time, so that it will not be necessary to depend on fresh material for corneal grafts.

Dr. Breinin showed and commented on a film demonstrating the technique practiced by Dr. Ramon Castroviejo in this type of corneal surgery.

CONGRESS IN ASIA

The XIX International Congress of Ophthalmology meets at Vigyan Bhuvan, New Delhi, India, December 3-7, 1962. This is the first of these meetings to be held in Asia. All ophthalmologists are invited to attend.

The languages used will be English and French. There will be about fifty free papers, to be scrutinized before delivery. The International Association for the Prevention of Blindness and the International Organization against Trachoma will hold meetings during the Congress.

Inquiries regarding the meeting, subjects for discussion, other program details and travel arrangements should be addressed to the Secretary-General, Dr. Y.K.C. Pandit, Bombay Mutual Building, Sir Pherozeshah Mehta Road, Bombay 1, India.

In the Service of Sight

. . .

WILLIAM LEMUEL BENEDICT, M.D.

REVIEWING the distinguished career of an eminent physician one naturally wonders about the early influences that guided him into the field of medicine. William Lemuel Benedict, M.D., of Rochester, Minnesota, former head of the department of ophthalmology of Mayo Clinic, internationally-known teacher, researcher, author and public health authority, reflected on this question in a recent interview.

Taking time out from his present administrative responsibilities as executive secretary-treasurer of the American Academy of Ophthalmology and Otolaryngology, he thought back over the years to February 13, 1885, when he was born in a small village in eastern Indiana, the son of Dr. Hanford and Grace Lanham Benedict.

"As the twig is bent, the tree will incline," he said. "There was the early influence of my father's profession and there were circumstances peculiar to the times. I grew up in an era when elocution, fiction and poetry were more popular among young students than sports. Throughout the midwest practically every town had a college and rivalry was intense. There were auditoriums, but no athletic fields.

"My father had gone to Springport, Indiana, at the age of nineteen to teach in the rural schools after graduating from Newburgh (New York) Academy in 1856. He read medicine in the office of a local surgeon for a few years, attended the University of Indiana, and after graduation spent

a year in the medical department of the University of Michigan. It was during the Civil War that he began to practice medicine in the small Indiana town. He also maintained a drug store and for years was the postmaster.

Early Years

"I literally grew up in the combined doctor's office, drug store and post office and as the only son was with my father almost constantly. It was his admonition that whatever else in life I wanted to do I should first teach school for a few years. This was a family tradition; all my close relatives were public school teachers. The dominant influences in my early days were teaching and medicine—and I've spent a lifetime in both fields in a professional capacity."

After graduating from Spiceland Academy and attending Indiana State

Normal School, Dr. Benedict taught in rural and city schools. With this background he began his medical training at the University of Michigan Department of Medicine and Surgery. He recalls that one of his eighth grade pupils in his first country school graduated in medicine at Indiana University before he completed his own course at Michigan in 1912.

His entrance into ophthalmology came about by chance. He had applied for the service in neurology, but another classmate got the appointment. Later in that season an interneship in the eye department became vacant and he was accepted for it. Only a few months passed before he was called home to Springport by the illness of his father and was made postmaster.

"I was stuck with it," he said. "After several months I persuaded the President to appoint my mother in my place and I went back to University Hospital. Following graduation I remained as a graduate interne and assistant-demonstrator, the first in the eye department. This was the beginning of the three-year residency at Michigan, and the setting up of a three-year graduate service in ophthalmology. I later set up the same service at the Mayo Clinic graduate school. During my third year at University Hospital I was permitted to help with the undergraduate students as demonstrator and quizmaster."

Joins Mayo Clinic

Dr. Benedict left Michigan in 1914 and entered private practice in Fresno, California. Three years later the opportunity came to join the Mayo Clinic as head of the department of ophthalmology.

"I welcomed it," he said, "because of the teaching connections with the University of Minnesota. I've always been happy in institutional work. It was through my experience at Mayo Clinic that I became active in medical and public health organizations." In 1919 he was made associate professor of ophthalmology in the graduate school of the University of Minnesota, Mayo Foundation, and two years later received the rank of professor.

Among his many affiliations with medical boards, committees and societies Dr. Benedict served as a member of the American Board of Ophthalmology 1936–1944, as consultant to the Board 1947–1958, and in 1959 was made emeritus consultant. He was a delegate from the American Medical Association's Section on Ophthalmology to the House of Delegates 1949–1957, and received the A.M.A. Section *Prize in Ophthalmology* in 1957. One of his outstanding services to public health has been given as a member of the National Advisory Neurological Diseases and Blindness Council, U. S. Public Health Service, 1956–1960.

Author and Editor

His contributions to the literature include more than 200 scientific papers, reviews and articles published in journals, cyclopedias and textbooks. He has served on the editorial board of the *A.M.A. Archives of Ophthalmology* since 1937, on the editorial board of the *American Journal of Ophthalmology* since 1939, and since July 1950 as president of the Ophthalmic Publishing Company. When the *Transactions of the American Academy of Ophthalmology and Otolaryngology* was established as a bimonthly publication in 1940, Dr. Benedict was made editor-in-chief, a position he still retains. He

is also a member of the editorial boards of the *Journal of the American Medical Sciences, Quarterly Review of Ophthalmology and Otolaryngology, Ophthalmologia Ibero-Americana* and Ophthalmology Section XII of *Excerpta Medica;* and has served as editor of or contributor to many other important medical publications.

Dr. Benedict was secretary-general of the XVII International Congress of Ophthalmology which convened in Montreal and New York in September 1954, and was president of the American Ophthalmological Society the same year. A list of the professional societies in which he holds membership, often in an executive capacity, would fill several pages. Among them are the American Association for the Advancement of Science, American College of Surgeons, American Medical Association, International College of Surgeons (Hon.), American Academy of Optometry (Hon.), Minnesota Academy of Medicine, Minnesota Academy of Ophthalmology and Otolaryngology, and Pan-American Association of Ophthalmology. He has received honorary memberships in a number of medical societies here and abroad. In 1955 the University of Michigan conferred on him the honorary degree of LL.D.

He presented the Eleventh deSchweinitz Lecture before the Section on Ophthalmology, College of Physicians of Philadelphia in 1948. In 1949 he gave the Abner Wellborn Calhoun Lecture before the Medical Association of Georgia in Savannah, and in 1950 he delivered the E. J. Curran Lecture in Ophthalmology at the University of Kansas.

For the last seventeen years Dr. Benedict has been a member of the board of directors of the National Society for the Prevention of Blindness; a vice-president from 1950 to 1953. His wisdom, broad technical knowledge and executive skill have been of inestimable value in guiding the organization's policies and activities. Some ten years ago he served as chairman of its Committee on Planning and Scope. This committee made an intensive study of the focus of the Society's program, leading to the development of state committees and chapters.

He was the first chairman and is currently a member of the NSPB committee which allocates grants for research in eye disease. His many contributions to the field in which the Society works led to his being awarded in 1950 the Leslie Dana Medal.

Dr. Benedict retired from Mayo Clinic in 1950, and from his post at the University of Minnesota in 1951. He continues to maintain a very busy schedule of activities, which include direction of the AAOO and the program of the annual meeting held in Chicago, and many other related responsibilities.

A man great in physical stature, in intellect and human qualities, Dr. Benedict reflects much of the simplicity that characterized his early life.

"I was born too early, but not too soon," he said. "I was a seven months, two-and-three-quarter-pound baby, born on a farm on the night of a cold Friday the 13th while my father was stuck in a snowdrift on a sick call two miles out in the country. Fortunately, perhaps, it was before the time of incubators and bottled oxygen. At any rate a basket behind the kitchen stove served its purpose well."

F.N.

News of the Colorado Chapter

AS PREVIOUSLY reported in *Sight-Saving Review*, a series of 12 half-hour television programs dealing with eyes and eye health has been developed by the NSPB Colorado Chapter in cooperation with the state Ophthalmological Society, the Guild of Prescription Opticians and the Denver Public Schools. The subjects include glaucoma, cataract, optics, corneal transplants and crossed eyes.

Of special interest is the recent announcement that the series, called "Eyes for the Future," has been sold to National Educational Television. Thus the films, which have had wide distribution in Colorado, will be shown throughout the country.

Forty-one stations are affiliated with National Educational Television. It is not mandatory that the films be shown by the affiliates but a request from a local ophthalmologist will undoubtedly result in their being shown.

If there is no educational television station in a community it may be possible to borrow some of the subjects from the Guild of Prescription Opticians of America, New York City, which has the entire series. Alcon Laboratories, Fort Worth, Texas, has five of the subjects, and would undoubtedly be willing to lend them for a showing in that area.

At the annual meeting of the NSPB Colorado Chapter on October 20, its president, Mrs. Austen G. Brown, presented the Denver Guild Opticians, represented by their president, John Monaghan, with an award for their participation in the production of the series. She also emphasized the invaluable service of the many physicians who donated their time and talents in its development.

At annual meeting Mrs. Austen Brown, president, NSPB Colorado Chapter, presents award to Harold Johnson, president, Channel 6, Station KRMA-TV, Denver, for the station's cooperation in developing and exhibiting the TV film series, "Eyes for the Future," now to be shown nationally.

Mrs. Brown reported that the eye bank sponsored by the chapter now has 900 donors on its list and 47 transplants have been performed.

Mrs. Marvis E. Quam, secretary, made fourteen field trips during the year, visiting 46 organized groups. New preschool vision screening programs have been inaugurated and almost 1,000 persons have been screened for glaucoma.

Mrs. Ruby Hopkins, director of NSPB field service, attended the meeting and praised the chapter for its many activities.

The Colorado Chapter is cooperating in plans for the 1960 NSPB Annual Conference to be held in Denver March 30-April 1.

VISION SCREENING IN A CHILDREN'S CLINIC

JULIA SCHADE, R.N.

Head Nurse, Kiwanis Diagnostic and Outpatient Center
James Whitcomb Riley Hospital for Children
Indiana University Medical Center, Indianapolis

This recently inaugurated program has demonstrated to physicians, nurses and parents the importance of detecting visual defects in young children.

ROUTINE vision screening is not accomplished as commonly as one might suppose in children's outpatient departments, even in teaching centers. The opening of the new Kiwanis Diagnostic and Outpatient Center for Children at the James Whitcomb Riley Hospital provided an opportunity to include this procedure as part of the diagnostic services offered to patients at the Indiana University Medical Center.

The Kiwanis Outpatient Department serves as a diagnostic and therapeutic center for children who are referred by family physicians throughout the state. The clinic is equipped and staffed to deal with almost any problem. The work-up of a patient presenting a diagnostic problem begins at 8:00 A.M., and it is usually possible to complete the study of such a patient in one day. At the conclusion of the investigation a letter is sent by the director of the clinic to the referring physician, outlining the findings and recommendations of the staff.

In achieving a comprehensive evaluation the clinic medical staff is assisted by social workers, psychologists and graduate nurses, including a nurse with public health interests. Since the objective has been the provision of optimal medical services for children, attention has been given to various screening procedures. All new patients seen in the Children's Diagnostic Clinic receive vision, audiometric and speech screening, along with a routine urinalysis and blood count. Plans are also being made for routine dental screening by a dental hygienist.

Program Impetus

Instigation of this routine procedure received impetus from a community-wide program for vision screening of preschool children in Indianapolis. It was felt that this program, accomplished by the services of volunteers, could be adapted to use in the clinic by the nursing staff as part of their daily functions. The clinic nurses had an opportunity to learn the vision screening technique by attending classes taught by Mrs. Florence Cunningham, nurse consultant of the National Society for the Prevention of Blindness. Provision of temporary screening equipment by the local chapter of NSPB facilitated the inauguration of the clinic program.

The clinic staff patterned their routine for vision screening along the

lines of the community program. At the start of each diagnostic work-up the physician obtains a history and performs a physical examination. While the doctor is eliciting the history, or after he has finished the physical examination, the child is taken from the room and is screened by the nurse for both visual and hearing acuity. The child's speech is also evaluated with the help of a consultant from the Audiology and Speech Clinic. The results of the screening procedures are recorded on a 3″ x 5″ card along with the patient's name, address, hospital number, and other identifying information. Findings are also recorded on the patient's chart.

After completion of the history and physical examination the doctor presents his findings to the director of the clinic in a disposition-teaching conference which is attended by all members of the diagnostic team. Along with the other data considered, the medical team is interested in the findings of the screening procedures. Where indicated by these findings the medical staff arranges for referral to the Eye Clinic at the Medical Center or to an eye specialist in the child's own community. The results of the various screening procedures are communicated to the referring doctor in a letter sent by the clinic director.

Who is Screened?

The staff attempts to screen all children above age three to four years. Using the method recommended by Mrs. Cunningham, the Snellen E illiterate chart is employed for testing visual acuity. The child is shown one symbol at a time and asked to point the direction of the E. For the younger or mentally retarded children a practice session is necessary. The nurse pulls a large paper E from behind her back and has the child practice pointing in the proper direction. When she is confident that the child understands what is expected of him she tries screening with the wall-illuminated chart from 20 feet. Footprints painted in a bright yellow paint mark the 20-foot line on the clinic floor. If the child wears glasses he is tested both with and without them. When the nurse has a question about the screening of a particular child she consults the doctor responsible for the child's care.

Problems and Solutions

The nursing staff has been able to test successfully the visual acuity of most of the children three to four years of age and older seen in this clinic. Occasionally there is some difficulty with the younger ones, some with cerebral palsy, the mentally retarded, and those who are unusually nervous or apprehensive. A school nurse, observing in the outpatient department, mentioned that she used a large wooden E to test mentally retarded children in the schools. Acting on this suggestion, a large red wooden E was made for the clinic. This has proved to be very helpful in the testing of younger or retarded children. They can match the wooden E with the one on the chart when they cannot point with their hands in the direction of the E. In cases where the child cannot be tested because of apprehension or inattention satisfactory screening may be done on follow-up visits after the child has become more comfortable in the clinic. At times, having a parent practice with the child at home, using a cardboard

E symbol, has made successful testing possible on a return visit.

The Nurse's Role

The nurses involved in the vision screening have been gratified with its success. They have been pleased to be able to add it to the services that the Kiwanis Outpatient Department offers to the children of Indiana. Initially, however, the nurses felt that technicians should be trained for the job. There was also some skepticism among the house staff about the necessity for or accuracy of such screening. During the eight months that the program has been in operation, however, it has proved its value. The accuracy of the screening has been authenticated by referrals to eye specialists, and the clinic medical staff has come to appreciate and expect this service.

It has been the experience of the nursing staff that vision screening by the method reported here does not take an undue amount of time. Each nurse has learned to take additional advantage of the time by observing the child. Moreover, she becomes acquainted with him through this procedure and can thus help him with his clinic experience. The clinic director welcomes the nurses' observations when the children are discussed in the disposition conference. It is felt that the background and interests of the pediatric nurse make her ideally qualified for conducting vision screening as an important professional duty.

Screening Results

Since the inception of this program 438 children of various ages have been screened. The findings in 91 cases led to their retesting or were brought to the clinic doctor's attention. The following examples illustrate why the nurses have found this service to be rewarding.

For the younger children, or for those who are mentally retarded, a practice session is necessary before the actual test is given.

One 13-year-old girl, striving to make all A's in school, was found to be able to read only the 20/200 line with both eyes. Although she had complained of not seeing well, her vision had not been checked since before she started school! The screening results, and discussion of the findings with the parents by the medical staff, led the parents to obtain the necessary care.

Another child seen in the clinic had vision of 20/70 with glasses which had been prescribed only a short time before. When checked following the screening by another eye doctor, she received new glasses. We have also found some children who wore glasses to have 20/20 vision without them.

One child who had been treated for years for glomerulonephritis was found

When the child appears to understand what is expected of him he is given the visual acuity test at 20 feet from the illuminated chart.

to have both visual and auditory impairment. With these findings and the family history, an interesting, newly described renal disorder associated with ocular lesions was diagnosed by the physicians.

Future Plans

It is hoped that in the future routine screening may be accomplished on *all* children seen in the clinic. It is thought that volunteers could be trained to provide the added screening under the supervision of the nursing and medical staff. Also in the planning stage is a follow-up program to determine whether parents consult their local eye specialists when recommended by the clinic. We feel this is important as some of the parents seen here had previously been advised of their child's diminished visual acuity, but had not obtained medical help.

This vision screening program in a general children's clinic, which has been made possible by generous support from the Riley Memorial Association, has made an important contribution to comprehensive medical care. Moreover, it has demonstrated to the physicians and nurses, as well as the parents, the importance of finding visual defects in children. It has also been satisfying to experience the interest and appreciation expressed by many parents for this total interest in their children.

LOUISVILLE EYE BANK

Persistence and hope brought to fulfillment in January, 1958 a 13-year-old dream of establishing an eye bank in Louisville. The local Lions Club had organized the Sight Restoration Society of Kentucky in 1945 with plans for the first eye bank in the state. Last year they appropriated $14,000 for that purpose, and for an eye research laboratory. Lions throughout Kentucky and Southern Indiana participated in fund-raising activities. A refrigerator for storing eyes and vitreous fluid was contributed by General Electric of Louisville.

On its first anniversary the eye bank reported that 18 corneal transplants had been performed; it had processed 140 eyes for research and had obtained 2,239 individual eye pledges. The bank is housed in the University of Louisville Medical School's surgical research laboratory and is under the medical direction of Dr. Roderick MacDonald. Charles E. Cox, representing the Lions, is co-director. The bank now provides information to doctors throughout the state, as well as research facilities.

Mary P. Riedley reports on this important project in *The Lion*.

GLAUCOMA SCREENING IN CHATTANOOGA

ARTHUR J. von WERSSOWETZ, M.D., M.P.H.
Assistant Director, Hamilton County Health Department
Chattanooga, Tennessee

SIXTEEN Lions Clubs cooperated in organizing and promoting the first mass glaucoma screening project to be held in the Greater Chattanooga area. With Mark A. Spector serving as chairman of their glaucoma screening committee, 876 Lions and some of their wives worked tirelessly to publicize the project and its objectives and aided in its efficient management on G-Day.

The location chosen for the screening was the First Christian Church, since it provided an adequate physical plant and sufficient parking facilities. Through the local press, television and radio stations persons over 40 years of age were invited to come for the screening at 1:00 P.M. on June 18. In attendance were 11 ophthalmologists, some 25 of their qualified nurses, eight public health nurses, 25 nurses from the local Nurses' Training School, and the director of the local Health Department.

At 12:30 P.M. on G-Day the auditorium of the church was filled with about 250 persons. All were registered and given a card to be filled in with pertinent information. A movie on glaucoma, "Hold Back the Night," was shown, and then the candidates for screening were called by numbers stamped on their cards to proceed to the examining section. This allowed for a controlled flow of traffic.

At first visual acuity tests were performed on all persons. Soon, however, it was realized that this procedure was delaying the smoothness of operation and was competing with the primary goal—glaucoma detection. Since the bottleneck at the visual acuity stations was threatening the success of the project, the procedure was dropped upon advice of the medical consultants.

Examinations were done in four areas where tables were arranged to have the persons in a recumbent position. The results were noted on the cards carried by the examinees, who were then directed into the interpretation room where these results

Distribution of Persons With Positive Findings Suggestive of Glaucoma By Age Groups, Sex, History of Treatment and/or Disease in Relatives

Age	Under 40	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	Over 80	Not stated	Rx for Glauc.	History Glauc.	Sub Total	Percent of Total (1341)
Male	1	6	3	8	4	1	1	5	0	3	1	0	3	33	2.5
Female	0	1	5	7*	7	2	7*	5*	1	1	2	3	3	38	2.8
Total	1	7	8	15	11	3	8	10	1	4	3	3	6	71	5.3

* Includes one case each of previously known and treated glaucoma

Scene at the First Christian Church where 1,341 persons were tested for glaucoma in a single day.

were explained to them by the public health nurses. Persons with findings suggestive of possible glaucoma were given a brief consultation individually at a separate table and for each a referral card was written out which carried on its reverse side the names of all qualified ophthalmologists in the Chattanooga area. These persons were urged to follow up the screening procedure with a thorough examination in the near future.

Persons with normal findings were advised to undergo the screening procedure annually, since glaucoma is an insidious disease.

A total of 1,341 persons were processed through all stages of the program, including interpretation. Actual registration was 1,381; however, some persons left before being examined because of lack of time; (some were on their lunch hour, which incidentally was the peak hour in attendance); others apparently got lost and did not reach the interpretation station, thereby walking off with their cards.

Women attended in greater number than men, the ratio being 58.1 per cent to 41.9.

The accompanying table shows the distribution of persons with positive findings suggestive of glaucoma. Age, sex, previous treatment for the disease and history of glaucoma in relatives is recorded. Noteworthy is the fact that of the 71 positive cases, only three were of known glaucoma previously treated, while 68 were in persons unaware of the impending danger of the disease.

Although fewer men attended, their rate was 5.8 per cent with positive findings, as compared to 4.8 per cent for women. The overall rate of positives was 5.3 per cent, somewhat higher than the national screening level.

The project was a complete success from every standpoint. There were some kinks which were unavoidable and unforeseen; nevertheless, the whole undertaking was of great inspiration to all who worked so hard and the results were most gratifying. The very next day nine of the 68 unknown positives reported to ophthalmologists for thorough check-up and/or treatment of glaucoma. The Health Department will follow up all positive cases.

Progress in Glaucoma Control

WILLIS S. KNIGHTON, M. D.
New York, N.Y.

The chairman of the National Society's Committee on Glaucoma reports on 1959 activities aimed at early detection of the disease.*

THE Committee on Glaucoma of the National Society for the Prevention of Blindness met in Chicago on October 13 during the annual meeting of the American Academy of Ophthalmology and Otolaryngology to review the glaucoma control program.

Community Screening

The committee was pleased to note that during 1959 the Society provided information and assistance to community glaucoma screening projects organized under sound professional guidance in 14 states. In addition to finding persons in need of eye care who were unaware of any symptoms these projects have great value in educating the community about the importance of early detection of eye trouble and where it is suspected the need for seeking medical advice without delay.

The committee expressed concern about the activity of civic clubs and other local groups in initiating glaucoma screening when the proper professional guidance may not be available. Such programs require careful advance planning, guidance and participation of the ophthalmologists and other professional personnel such as social workers and nurses.

Even though the results of the tests are negative, persons screened should be urged to have periodic examinations because of the possibility that glaucoma may appear later. A false sense of security must be avoided.

The committee discussed the Society's function in relation to these detection programs and it was recommended that a manual of procedures be prepared.

There was discussion of the need for carrying on periodic detection programs among the same population group over a period of years such as might be done through an industrial medical department. Through following the same group of individuals it would be possible to investigate various factors related to early diagnosis.

Annual Discussion Meeting

The annual glaucoma discussion meeting sponsored by the Committee on Glaucoma was held in connection with the AAOO for the seventh consecutive year. The subjects covered were: research in glaucoma detection methods; a community-wide glaucoma screening program; and interpretation of the results of tonography, a diagnostic test. Those participating were Elmer J. Ballintine, M. D., Cleveland; Bernard Becker, M. D., St. Louis; W. Morton Grant, M. D., Boston; Carteret Lawrence, M. D.,

* Presented at the Meeting of the Board of Directors, National Society for the Prevention of Blindness, New York, December 10, 1959.

Dr. Knighton measures the tension of one of the physicians who visited the exhibit of the NSPB Committee on Glaucoma, during the annual meeting of the American Medical Association. The exhibit was contributed to NSPB by the San Mateo County (Calif.) Medical Society.

Baltimore; Murray McCaslin, M. D., Pittsburgh. There were 71 ophthalmologists from 21 states and 3 foreign countries in attendance. Notes of the discussion were recorded and will be distributed to those present. There have been many favorable comments about this session and the audience has grown each year.

Distribution of Film

The film, "Glaucoma—What the General Practitioner Should Know," continues to be in great demand. Since its production in 1951 the 16 prints in the Society's office have been shown to audiences totaling more than 40,000 physicians, medical students and nurses in 47 states, including Alaska and Hawaii, the District of Columbia, Canal Zone, Puerto Rico, and six foreign countries. In addition 24 prints are circulated by the American Medical Association, state health departments and National Society chapters and committees. Seven prints of the Spanish version are circulating in the Pan American countries.

Exhibits Presented

The committee presented an exhibit on early glaucoma detection at the annual meeting of the American Medical Association in Atlantic City, June 8-12. Of the 130 physicians and wives who were tested, 12 were referred for an ophthalmological examination because of having tension higher than the normal range. Of particular interest was the fact that 101 of those tested were wearing glasses and had consulted an eye physician, but 63

had never had tension measured although all were age 40 and older.

Guidance in setting up similar exhibits was provided during the year to state and regional medical societies meeting in the following states: Georgia, Texas, Vermont, West Virginia and Wisconsin.

Discussion at APHA

A panel discussion on "Community Projects for the Early Detection of Glaucoma" was arranged at the annual meeting of the American Public Health Association in Atlantic City, October 19-22. Participants included an ophthalmologist, public health physicians, and a medical social worker, all with extensive experience in conducting programs of this nature. A report will be published in *Sight-Saving Review* and the *Journal of the American Public Health Association.*

The annual Mark J. Schoenberg Memorial Lecture sponsored jointly by the Committee on Glaucoma and the New York Society for Clinical Ophthalmology was delivered on December 7 by A. B. Reese, M. D., who spoke on "The Role of the Pigment Epithelium in Ocular Pathology."

GLAUCOMA PROGRAM OF WASHINGTON SOCIETY

Fifty-nine cases of unsuspected glaucoma have been discovered in detection tests conducted by the Prevention of Blindness Society of Metropolitan Washington during the past three years, reports Helen Curtis Demary, executive director. Because the disease was diagnosed early, most of these people will be able to keep good eyesight throughout their lives. In addition, the Society reports 19 borderline cases currently under observation and 42 still awaiting confirmation from doctors. A total of 5,123 people have been tested by the Society in a continuing effort to find and arrest this disease in its early stages.

Since the program was started in 1956, employees of a large insurance company, a department store, a newspaper, members of Lions Clubs, the Pilot Club and 2,300 employees of the Department of Health, Education, and Welfare have been tested, in addition to the general public. Initial support for the program came from the Lions Clubs whose major project is the conservation of vision.

Recently the Society has concentrated on testing relatives of known glaucoma patients, since the disease is five or six times as common among relatives as among the general public. This is said to be the first program in the country designed specifically for blood relatives of glaucoma patients.

The Society has just published an excellent 16-page pamphlet titled "Glaucoma—the Sneak Thief of Sight." Prepared by Miss Demary and Martha Elliott, health educator, it explains in simple terms the nature of the disease and its treatment, and emphasizes the importance of early detection. Illustrations by Walt Disney Productions, Inc. add greatly to the effectiveness of the text. The pamphlet has been approved by the glaucoma advisory committee, ophthalmological section, District of Columbia Medical Society. Inquiries regarding its distribution may be addressed to Miss Demary at 1025 Vermont Avenue N.W., Washington 25, D. C. It will be available at nominal cost to prevention of blindness agencies throughout the country.

Coordinating Educational Services for the Partially Seeing Child

The problems which relate to this handicap have significance for all with whom the child comes in contact.*

Presiding: MRS. DOROTHY BRYAN, *assistant to the director*, Division for Exceptional Children, Illinois State Department of Public Instruction, Springfield

Chairman: MRS. HELEN FIELDS, *director*, Bureau of Education of Visually Handicapped, New York City Board of Education

Summarizer: MISS MARY FITZGERALD, *assistant director*, Bureau of Health Education, New York City Board of Education

Participants, all of New York City: SAMUEL LOSSEF, M.D., *consultant ophthalmologist*, Bureau for Handicapped Children, Department of Health; LEAH HOENIG, R.N., *pediatric nursing consultant*, Handicapped Children's Program, Department of Health; MRS. FRANCES M. SAVAGE, *supervisor*, Bureau of Education of Visually Handicapped, Board of Education; DORIS SCHULMAN, PH.D., *supervising psychologist*, Bureau of Child Guidance, Board of Education; EDWARD H. BURKE, M.A., *guidance counselor*, Bureau of Education of Visually Handicapped, Board of Education; MRS. MARGARET S. DOUGLAS, *principal*, P. S. #129, Manhattan; MRS. SARA B. MEERKAMP, *teacher of partially seeing*, P. S. #86, Bronx; FLORENCE COVINA, *regular teacher*, P. S. #86, Bronx; MRS. MILDRED KEATING, *acting supervisor*, Bureau of Education of the Visually Handicapped, Board of Education; and CHARLES M. POLAN, M.D., Huntington, West Virginia.

MRS. BRYAN welcomed the conference delegates to the session and introduced Mrs. Fields who emphasized the progress that has been made in recent years in special education techniques. She stressed greater awareness of the roles the various services can play in the development of the partially seeing child, and the many ways that have been found to care for him in a school situation. There are many resources and many experts to enrich his education.

There are now 1,000 partially seeing children in the New York City schools and their placement is constantly being evaluated by professional groups such as are represented on this panel.

Dr. Lossef, ophthalmologist, pointed out that the earliest possible discovery and placement is necessary for the best interests of these children. To this end the New York City Department of Health cooperates with some 800 schools in maintaining a well-planned health service.

Miss Hoenig, supervising school

* Summary of a panel discussion at the 1959 NSPB Annual Conference, February 25, 1959.

nurse, outlined the services of the public health nurse to visually handicapped children. These include family teaching and guidance so that the needs of infants and preschoolers will be understood; observation of the physical, social and emotional climate of the home; stimulation of interest in preschool vision programs; and referral to community health or social welfare facilities as indicated.

For the school-age child these services include sharing knowledge and information on eye health and eye problems with school personnel and families; participating in improvement of vision screening techniques; interpreting diagnosis, recommendations and plans for treatment to school personnel and families; referring reports to the consulting ophthalmologist for children in need of modification of the regular school program; conferences with teachers; and follow-up to insure continuous care.

Children Better Adjusted

Dr. Schulman, supervising psychologist, reported that the current program of cooperative service had resulted in greatly improved school adjustment for the partially seeing children. A guidance counselor assigned to the Bureau for the Visually Handicapped gives full time to their problems, helping them to plan careers and to live more productive lives.

Mr. Burke, guidance counselor, described counseling techniques used with the visually handicapped. These include conferences with the teacher most familiar with the child's abilities and limitations, and a careful study of his cumulative record, including eye report, intelligence test result, school record, and such factors as the socio-economic level of his home and his language background.

The counselor's interview with the pupil may include only such items as the selection of an appropriate high school, or the choice of language study. However, when there is deep-seated emotional involvement or feeling of resentment on the part of the pupil, extensive preparation for the first interview may be indicated and several more may be necessary. Referral to a clinical agency geared to meet the needs of the emotionally disturbed may be indicated. In general the pupil is guided to think his own problems through realistically, and to arrive at a solution himself. Conferences with parents are an adjunct to pupil counseling.

School Tone a Factor

Mrs. Douglas, principal, said that what any handicapped child needs is a good school in which the special program planned for his particular handicap can prosper.

Are not most children handicapped in some way, she asked. Aside from the obvious disabilities, there are those of poverty or riches; race, religion, or national origin; differences in mental endowment; shyness or aggressiveness; in short, all of the forces that enter our lives are distributed to each one in varying measures. Then, when we superimpose upon this uneven distribution of nature's and society's contributions the added burden of a specific handicap—poor vision—these children are entitled to the best that educators can plan for them.

There must be good school tone, Mrs. Douglas said. This is essential for the growth of all children. There

must be a calm, relaxed, yet controlled atmosphere. Nothing should be haphazard—everything carefully planned but never rigid. The children—all the children—must be taught, re-taught, and constantly encouraged to live together in a friendly way. In this atmosphere of good living the visually handicapped children will thrive.

Through the school day, when they are not working with their special teacher, they are with classes of their grade levels. The proper placement of these children is vital. Reading level, physical size, emotional maturity are but a few of the factors to be considered. If the school tone is right and staff relationships good, the partially seeing are welcomed into any regular class by both pupils and teacher. They take part in all of the special activities as well.

The supervisor has conferences with the teacher on the progress or problems of each child. Very often scholastic retardation accompanies the physical handicap. This may be due to time lost in going to clinics, or belated discovery of poor vision, or any number of other reasons. Good supervision must be available for helping the child make up lost ground, if this can be done without overtaxing his vision.

Mrs. Douglas pointed out that the parents of these children must not be overlooked. It may take a special effort to get them into the parent-teacher association because they do not always live in the school neighborhood, but the effort will pay off for the children. At P.S. #129 a special point is made of inviting parents to appropriate grade conferences where they discuss the work of the child's class and get a thorough understanding of what he should learn in the skill subjects for the year.

Early Contact with Other Children

Mrs. Savage, supervisor, in discussing the opportunities afforded the visually limited child in the New York City school system, emphasized the close, continuous contact with his peers in the initial period of learning. Added to this is the service of the resource teacher, always available to reinforce initial teaching, or, if necessary, to reteach. She is the one who provides special materials and supervises the use of low-vision aids. She makes certain that the integration of the partially seeing child within the regular class means more than just sitting and listening; rather, actual participation in all activities.

Recognizing the aptitudes and various potentials of these pupils is important in helping them get a good start in life. Mrs. Savage told about several high school graduates who had found jobs in which they were happy and successful. One went to work for a newspaper as a copy boy and runner. Another found a job as a messenger and mail clerk for a large company and did so well that he was able to get a similar job in the organization for a graduate of the next year's class. Two boys were admitted to and are attending top flight engineering schools; another is a messenger in a dental laboratory and one is attending Queens College at night, working daytimes as a barrel checker in a brewery at one hundred dollars a week.

Pleasant Workshop

Mrs. Meerkamp, special teacher, described the group of partially seeing pupils who come to her resource room

every day as "healthy, normal youngsters." The room has a workshop appearance, with its large-print materials, projection magnifier, audio aids and tilt-top desks. Like any other classroom it includes "the slow-learner, the bright, the aggressive, and the child who needs extra prodding and understanding to reach his potential." Such a classroom is kept humming with activity by the functioning of the individual programs that meet each child's needs. All curriculum areas are represented—taught and reinforced when necessary either in regular or special class. Each pupil's program is carefully planned and progress in each area is evaluated by the various teachers and the special teacher.

Some children are capable of functioning most effectively for a good part of the day in regular classes; some need a great amount of time with the special teacher to learn in a highly individualized setting essential reading, mathematics, writing and study skills. Nothing is static. Program changes are constant in line with progress.

Teacher Cooperation

Miss Covina, regular teacher, spoke of her role in utilizing the services of the various specialists to supplement her own knowledge of good teaching practices, so that a partially seeing child assigned to her may work, develop, and socialize with his peers with optimum results. Through many conferences and visits to the sight conservation classroom she keeps closely in touch with the special teacher, planning the child's program from week to week. If the regular teacher has the proper attitude toward this special member of her class, if she enjoys working with him, the rest of the pupils will readily accept him. The partially seeing child, in turn, will want to join his classmates in the assemblies, on class trips and in discussion and reporting groups.

Itinerant Program

Mrs. Keating, acting supervisor, reported that an itinerant teaching program was inaugurated in New York two years ago. At that time two specially trained teachers were assigned to service approximately 30 children. Now the service has grown to include 85 children serviced by four teachers and, in addition, 41 children are helped by the special teacher in their own schools.

The children served by the itinerant teachers are either in schools which have no sight conservation classes, or live at great distances from such facilities. The amount of time spent with each child depends on individual needs, interests and abilities. The itinerant teacher works closely with school personnel, provides special materials for the pupils, and interprets the program to the parents and community to the best of her ability. She holds many conferences with parents, talks at grade conferences, at mothers' club and parent-teacher association meetings.

Miss Fitzgerald, assistant director, Bureau of Health Education, pointed out in her summary of the panel discussion that one factor highlighted by every speaker should be regarded with special significance, namely that the effects of a severe visual impairment are felt not only by the child himself but have implications for the members of his family, his peers, and the community in which he lives. The psychological and emotional problems

which often accompany the handicap have significance for all with whom the child comes in contact.

Dr. Polan, of Huntington, West Virginia, expressed his interest in comparing this program in a large city with that of Campbell County in his state, which has a school population of about 20,000. Facilities were set up there six years ago for the partially seeing children in the elementary grades and at present 15 are enrolled. Local ophthalmclogists, optometrists, Lions Club and Pilots Club have cooperated by giving service and special materials. The program has been very productive in relation to educational opportunities for these children.

SUMMER COURSES

According to information received to date the following colleges and universities will offer courses for teachers and supervisors of partially seeing children during the 1960 summer session. Detailed information can be obtained by writing the course directors.

Elementary Courses

George Peabody College for Teachers. June 13-August 18. Dr. Lloyd M. Dunn, coordinator, education for exceptional children. Nashville 5, Tennessee.

San Francisco State College. June 27-August 5. Robert A. Bowers, assistant professor of education. 1600 Holloway Ave., San Francisco 27, California.

Intersession. June 20-24. Workshop—Problems of the Visually Handicapped Student in the Secondary School. Enrolment limited.

Syracuse University. July 5-August 12. Dr. William M. Cruickshank, director, education of exceptional children, School of Education. Syracuse 10, New York.

University of Pittsburgh. June 27-August 5. Dr. Jack W. Birch, director, department of special education, School of Education. Pittsburgh 13, Pa.

Wayne State University. June 27-August 6. Dr. John J. Lee, chairman, department of special education and vocational rehabilitation, College of Education. Detroit 2, Michigan.

Advanced Course

Syracuse University. Advanced Workshop in Educational Guidance and Counseling for Partially Seeing. July 25-August 5. Coordinator, Helen Gibbons, consultant in education, National Society for the Prevention of Blindness. Dr. William M. Cruickshank, director, education of exceptional children, School of Education. Syracuse 10, New York.

A limited number of NSPB scholarships are available for the advanced course through Syracuse University.

PROPHYLAXIS TEST

As a safeguard against ophthalmia neonatorum the prophylactic use of a solution of an ointment of sodium sulfacetamide as compared to one per cent silver nitrate was tested in France, using 1,000 newborn infants in each group. The incidence of bacterial and viral infection among the infants receiving silver nitrate was lower than among those in the other series. However, the reaction to the silver nitrate was more apparent.

The report by G. Cousineau and L.L. Lloyd in the *Annales de Sainte-Justine*, as summarized in the September *International Record of Medicine*, emphasizes that adequate prenatal care of the mother may be the most important factor contributing to the reduction of ophthalmia in the newborn.

1960 NSPB CONFERENCE

March 30—April 1

Brown Palace Hotel

Denver, Colorado

For Educators of Children with Impaired Vision

an Extensive Program of Courses and Workshops at

SYRACUSE UNIVERSITY SUMMER SESSIONS

July 5—August 12, 1960

The following courses are offered in cooperation with the American Foundation for the Blind, Inc., City of New York:

- Student Teaching with Blind Children
- Principles and Methods of Teaching Braille
- Introduction to the Education of Blind Children
- Advanced Problems in the Education of Blind Children
- Workshop on Guidance and Counseling for Adolescent Blind Children (2 weeks–July 11-22)

The following courses are offered in cooperation with the National Society for the Prevention of Blindness, City of New York:

- Education of Partially Seeing Children (Theory)
- Education of Partially Seeing Children (Practice)
- Educational Implications of Visual Impairments
- Advanced workshop in educational guidance and counseling for partially seeing (2 weeks–July 25-August 5)

For further information write: Ferne K. Root, Box 50, Special Education Building, **Syracuse University, Syracuse 10, New York**

THE USE OF TINTED LENSES IN NIGHT DRIVING

In response to many inquiries concerning the use of tinted lenses in night driving the Committee on Industrial Ophthalmology of the Council on Industrial Health, American Medical Association, has prepared a report on the subject. Its opinion is summarized in the *Journal* of the AMA for October 17, 1959, as follows:

1. The use of any "night-driving" lens or windshield, whether tinted, reflecting, or polarizing, reduces the light transmitted to the eye and renders the task of seeing at night more difficult.

2. The source of glare in night driving is the contrast between the headlights of oncoming cars and the darker surroundings. The use of tinted lenses or windshields does not reduce the contrast but reduces the intensity of illumination from both the headlights and the surroundings, thereby impairing vision.

3. There is no scientific evidence to support any claim that the use of tinted lenses or windshields improves night vision.

ORIGINS OF OPHTHALMOLOGY

The spirit of investigation which flourished with the arts in Renaissance Europe produced new knowledge of the nature and structure of the eye. Andreas Vesalius, "father of anatomy," who in 1543 represented the lens as biconvex, his pupil Hieronymus Fabricius ab Aquapendente who laid the foundations for accurate physiological optics, and Georg Bartisch, "father of modern ophthalmology," who wrote the first text devoted entirely to the eye are three figures of this age discussed by G. E. Arrington, Jr., M.D. in the September *International Record of Medicine.*

NOTES AND COMMENT

• Sight-Saving Month

Sight-Saving Month, the National Society's annual campaign to alert American citizens to the value of proper eye care, was again observed in September.

More than 7,000 posters carrying the message, "HALF of all Blindness is Needless and Preventable," were distributed in Connecticut, Florida, Illinois, Massachusetts, Michigan, Montana, North Carolina, Ohio, Texas and Utah.

Billboards featured large posters in Arizona, Connecticut, Indiana and North Carolina, and, through the efforts of the chairman of the Kentucky NSPB Committee, three painted billboards were donated in strategic spots along main highways.

Newspapers, radio and television cooperated as in other years, giving generously of their space and time. Over 10,000 publications received the Sight-Saving Month publicity materials and many carried a feature story. A column called "Eye Cues" was circulated in mat form and appeared in over 300 papers with a circulation of 1,379, 360.

All television stations were supplied with slides and spot announcements, and to date reports have been received from 66 stations which used the material. The commercial value of this donated time is $93,037.90. The commerical value of time donated by 218 radio stations was $63,418.49. Both radio and television continue to use the message throughout the year.

Governors of 36 states issued proclamations, and the mayors of many cities also issued statements of endorsement.

Many NSPB chapters and committees planned special programs during September to highlight this special observance. Lions and Pilot clubs, Delta Gamma Fraternity and various civic organizations sponsored many activities.

• Dr. Goldmann Honored

The Proctor Medal has been awarded to Dr. Hans Goldmann of Bern, Switzerland among whose many achievements is the investigation of glassblowers' cataract, and the demonstration of a new form of reversible cataract. The medal was presented to Dr. Goldmann at the 28th annual meeting of the Association for Research in Ophthalmology, held in Atlantic City, New Jersey on June 10. Dr. Goldmann has always been keenly interested in the development of new instruments and the improvement of old ones. His studies of cataract led him to improve the slitlamp, and his applanation tonometer is an outgrowth of one line of his work in glaucoma.

The proceedings of the Association's first winter meeting are reported in a special issue of the *American Journal of Ophthalmology* Part II, September, 1959 which also includes Dr. Goldmann's acceptance address and his Proctor Medal Lecture elucidating some of the basic problems of simple glaucoma. He accepted the award with deep appreciation of the help his teachers and colleagues have been in his career.

• New Industrial Film

Great interest was centered on the new industrial eye safety film, "It's Up to You," which had its premiere at the National Safety Congress in October.

Presented by the Wise Owl Club of America under sponsorship of the National Society for the Prevention of Blindness, the film tells the story of Eddie Briggs and the price he paid for a moment's thoughtlessness in removing his safety glasses in the plant.

The full impact of a serious eye injury is felt by the viewer of the film in a sequence showing the surgeon actually performing the delicate technique of removing an imbedded piece of metal from the eye. Probably no more realistic picture of eye damage that need never have happened has been shown to an industrial audience.

"It's Up to You" shows many typical work situations which involve eye hazards, and demonstrates various types of eyewear available for specific conditions. It hits hard at the all-too-common practice of supplying eye protection for workers, and then not enforcing its proper use and maintenance.

Brittain F. Payne, M.D., executive ophthalmic surgeon at New York Eye and Ear Infirmary and NSPB board member, served as medical adviser in the preparation of the film, which was produced by Harvest Films, in cooperation with NSPB. James E. O'Neil, NSPB director of industrial service, was the technical adviser; Leo Trachtenberg producer-director.

The 16-mm. sound film in color runs for approximately 11 minutes. Purchase price $97.00. Rental $6.00 per day; $20.00 for five days; outgoing shipping charges prepaid.

"It's Up to You" is distributed by Harvest Films, 90 Riverside Drive, or Wise Owl Club headquarters, 1790 Broadway, New York City.

• Optical Aids Clinic

Tennessee's first optical aids clinic was opened at Vanderbilt University Hospital in September in cooperation with Rehabilitation for the Blind, marking a real step forward in services for the visually handicapped. The project is described in *Tennessee Public Welfare Record* for October.

Equipped with special examining equipment and magnifying lenses not ordinarily kept in stock by optical supply houses, the clinic is designed to serve persons with very low visual acuity. Experience in similar clinics elsewhere in the country indicates that persons whose visual acuity ranges between 20/70 and 1/200 can often be greatly benefited by special lenses.

Set up as a demonstration project, the clinic is the result of more than a year of planning by Services for the Blind and hospital officials. Purchase of the necessary equipment was made possible by a grant from the Office of Vocational Rehabilitation, U.S. Department of Health, Education, and Welfare.

The hospital is furnishing physical facilities plus the services of the house staff in ophthalmology and a part-time secretary. The Welfare Department's consulting ophthalmologist will supervise the project and a counselor has been assigned to work with all rehabilitation clients referred to the clinic. Cooperating with this group will be home teachers, social workers, psychologists and other hospital personnel when needed.

AROUND THE WORLD

GREAT BRITAIN

Needless Loss of Sight. Out of every 100 children born five or six are destined to lose the use of one eye. This conclusion was reached by Mr. R.B. Wellesley Cole on the basis of his finding of 527 patients with one practically useless eye among a consecutive series of 10,000 given routine examination under the National Health Service.

One per cent of all patients examined had one eye which was registrably blind; two per cent had vision in one eye which was so poor as to be quite useless. In the remaining two per cent of amblyopic patients the sight was not good enough for binocular vision.

An amblyopic patient is usually ignorant of his disability, relying unconsciously on his good eye, the author writes in the *British Medical Journal* for January 24. Unfortunately the condition starts in infancy and early childhood and is firmly established by the time the child starts school.

INDIA

Trachoma Week in Bombay. Twenty ophthalmologists donated their services during the week of July fourth to examine the eyes of 5,000 school children in Bombay. Each child was given a card indicating the condition of his eyes, so that if treatment were needed it could be begun in time.

The *Journal of the American Medical Association* for October 3 reports that the program was inaugurated by the sight conservation committee of the Lions Club.

JAMAICA

Vision Testing Campaign. The Jamaica Society for the Blind is using two units equipped to administer the Massachusetts Vision Test to check the eyes of 4,000 school children each term. The *Annual Report 1958-59* of the Royal Commonwealth Society for the Blind states that any child found with defective eyesight is referred to an eye specialist. In many cases the Jamaica Society pays for treatment or spectacles.

PHILIPPINES

Meeting in Manila. The Asia-Pacific Academy of Ophthalmology will meet in Manila October 10-13, 1960. Blinding diseases of Asia, including cataract, glaucoma, diseases of the cornea, trachoma and nutritional deficiencies of the eye will be discussed, according to the *AMA Archives of Ophthalmology* of September. Tours to Japan and Hong Kong are planned before and after the convention.

William J. Holmes, M.D. is secretary general of the Academy and may be addressed at 1013 Bishop St., Honolulu 13, Hawaii.

PORTUGAL

Education of Visually Handicapped. According to school physicians about one child in every 1,000 in this country is partially seeing and requires either special training or special consideration in the regular school curriculum. A study made by W.W. and I.W. Taylor on the education of handicapped children in Portugal, under auspices of several international welfare societies with the endorsement of

UNESCO, is reported in the September issue of *Exceptional Children*. Attention was given to various categories of handicap—problems of sight, speech, hearing and neuromuscular disabilities among others.

The blind may attend school in Portugal from age seven to 20, and even longer if they study in the conservatory of music. The partially seeing attend from age seven until they finish elementary school. In general, children with visual or auditory defects who can be educated by the same methods used for normal children are placed in regular classrooms and take part in all activities.

The Ministry of Social Welfare has almost complete charge of the education of handicapped children, with the exception of the retarded. The teachers of those with visual handicaps are recruited from among students in the various institutions who show special aptitude. They are not given special courses, only probationary in-service training at the schools where they will teach. Studies are presently being made with a view to reorganizing their teaching methods.

SOUTH AFRICA

Reaching the Bantu. Following a less auspicious tour in 1958, a mobile ophthalmic unit travelled around the Villa Nora area during the past Spring. This time activities were initiated by meeting with the acting Chief and the headmen of the area.

The staff included a European eye surgeon and nurse, and a social worker and nurse who are Bantu, states the *Report on Tour No. 35* of the South African National Council for the Blind's bureau for the prevention of blindness. The unit was stationed at the Bantu school. Patients came by a variety of means including bicycle, donkey cart, lorry and foot.

From an earlier report (*No. 34*) it appears that the number of cases of infectious eye diseases such as trachoma is relatively smaller in some places than others in Northern Transvaal. The difference is attributed to a plentiful water supply for regular washing in the healthier areas, as well as to the fresh fruit and vegetables that are available there.

WEST AFRICA

Seven Year Study. An extensive survey of the causes of blindness in West Africa was sponsored by the Royal Commonwealth Society for the Blind under the leadership of Dr. Frederick Rodger, and the results are now to be published in a 250-page book.

More than 8,000 people from widely different areas, in Ghana, the Cameroons and northern Nigeria were given intensive ophthalmological examinations, the society states in its *Annual Report 1958-59*. The main causes of blindness among these varying racial groups were found to be trachoma, cataract and onchocerciasis, but much sight is also lost through various systemic infectious diseases and diet deficiencies.

Sir Stewart Duke-Elder has written the foreword to the book in which he commends as an important scientific contribution the work of the society in evaluating the causes and distribution of blindness over such a vast area. That most of the blindness is preventable makes its tragedy more poignant, and the potential value of the study "... in terms of economic betterment and the relief of human suffering will be immense."

CURRENT ARTICLES

The Development of Ten Children with Blindness as a Result of Retrolental Fibroplasia. A. H. Parmelee, Jr., C. E. Fiske, and R.H. Wright. *A.M.A. Journal of Diseases of Children*, Vol. 98, p. 198. August 1959.

Ten prematurely born children with normal vision and ten prematurely born children who were blind as a result of retrolental fibroplasia were evaluated in the first year of life by means of the Gesell infant development test. All were considered to be developmentally normal at that time, although one of the blind children was found to have a severe hearing deficiency in addition to his blindness. This article is concerned with the further development of these children in the subsequent four to five years.

Seven of the premature infants with normal vision were available for retesting by the Stanford-Binet intelligence test and the Vineland Social Maturity Scale and all were normal at three to six years of age.

Six of the blind children are doing very well as determined by biographical reports of their play activities and social responses and also by psychological testing. Two of them have acquired a small amount of useful vision in one eye; a third child has useful vision in both eyes and can read large print with glasses. The remaining three are essentially totally blind. The child with the double handicap of deafness and blindness is progressing surprisingly well and is believed to be normal in his mental potential. However, it is impossible effectively to evaluate his abilities. He has acquired useful vision in one eye.

Three of the children are functioning at a mentally retarded level. They have behavior difficulties suggestive of severe emotional problems which may be the cause of their mental backwardness.

A tabulation of the development of four self-help items—walking without support, feeding self with a spoon, talking in sentences and toilet training—revealed some delay in the development of all except talking. This pertains to the six normal children, and those with some useful vision were not advanced over those without vision on these items. The three functionally retarded children did almost as well as the other children with respect to walking but had not had success with any of the other items by the age of four.

It was concluded that developmental examination in the first year of life is a valuable adjunct in the evaluation of prematurely born blind children. This is of particular value to their parents and the professional workers who aid the parents.

Biographical summaries reveal some of the details of the development of the individual children and the family problems associated with rearing a blind child.

Prevention of Retinal Detachment in Cataractous Eyes. A. Callahan. *American Journal of Ophthalmology*, Vol. 47, p. 576. April 1959.

A technique is described which reduces the possibility of retinal detachment after the removal of a cataractous lens by attaching the peripheral retina firmly to the sclera by means of

diathermy before catarectomy. When a retinal detachment has occurred after a cataractous lens has been removed from one eye this preventive technique for the fellow eye is indicated. It is also advisable in eyes in which idiopathic detachment has occurred in the opposite eye with or without cataract formation, or peripheral cystic degeneration of the retina has developed, or there is high myopia (–20 D) with evidence of choroidal or retinal stretching. It is not indicated when a retinal reattachment has been done on the cataractous eye in question.

This procedure, for which the author has developed a modification of Franceschetti's technique, is simpler and is more likely to result in retention of vision than reparative techniques.

The necessity for caution to avoid the loss of vitreous or rupture of the capsule when the cataract is extracted is explained.

The procedure has been successfully used on eight patients during the last four and a half years.

Tonographic Criteria in Early Glaucoma. Clinical Tonography as an Aid to the Diagnosis and Management of Early Glaucoma. W. Roberts. *American Journal of Ophthalmology*, Vol. 48, p. 31. July 1959.

After several years of systematic study of very early low-tension glaucoma the author is convinced that the clinical application of tonography provides criteria which makes possible early diagnosis before measurable structural damage is done. The 207 cases studied all had intraocular pressure readings below 30 mm. Hg (Schiøtz 1955 scale), and a majority were below 25 mm. Hg, at least during the early stages of study. Cases with obviously advanced glaucoma field loss were excluded regardless of the tension level. For purposes of the study tension levels above 22 mm. Hg were considered abnormal.

The cases subjected to complete study were handled by repeated utilization of the usual diagnostic techniques: tonometry, visual field study, gonioscopy and provocative testing. Lastly, tonography was used extensively and repeatedly. The positive diagnosis of simple glaucoma in many of the cases was made in large part on the basis of tonographic criteria.

The author concludes that tonography is essential and within the reach of most well-staffed offices where glaucoma is treated. Consistently low C (facility of aqueous outflow) values or a fall to subnormal C values after the water-drinking provocative test or a P_0/C ratio definitely greater than 100 after the water-drinking provocative test appears to constitute valid additional criteria for the diagnosis of early simple glaucoma. Therapeutic control of the C value seems to be the most nearly certain means of preserving fields.

The Influence of Tonography of One Eye on the Tonographic Readings of the Fellow Eye. A. Cambiaggi and W. M. Spurgeon. *American Journal of Ophthalmology*, Vol. 48, p. 130. July 1959.

The phenomenon of "ophthalmic consensual reaction" whereby stimulation of one eye produces an effect on the contralateral eye has long been known. The purpose of this research was to discover to what extent tonography performed on one eye of a

subject affects the tonographic readings for the other eye; what the average and extreme values of the changes are, and how changes in eyes with chronic simple glaucoma compare with those in normal eyes.

The experiment was performed with 32 normal eyes of 16 subjects who were found to be completely healthy on examination, and with 48 eyes of 24 subjects with chronic simple glaucoma. The Mueller electronic tonometer with recording unit was used. Tonographies were performed using two time intervals of two and four minutes each. For the glaucomatous eyes the use of miotics was discontinued for a period of 48 hours prior to and during the test. On the first day tonography was done first on the left eye then on the right. After two or three days the procedure was reversed. All subjects were tested at the same time of day.

The data indicate, but with these small samples do not prove, that the average intraocular pressure for either right or left eyes, normal or glaucomatous, is decreased by prior tonography on the contralateral eyes. Decreases ranged up to 7.0 mm. for normal eyes and 8.8 mm. for glaucomatous eyes.

The average facilities are not significantly changed in either right or left eyes by prior tonography on the contralateral eyes. This is true for both normal and glaucomatous eyes, the authors report.

The average flow in normal left eyes is significantly higher (five per cent level) when tonography is performed on these eyes first with four-minute intervals. The trend is in the same direction for normal right eyes with the same intervals, but the difference is not significant. None of the differences between average flows is significant for normal eyes at two-minute intervals or for glaucomatous eyes at either interval.

In individual subjects both increases and decreases are noted for tonographic values following tonography on the contralateral eye. Therefore no general rule can be given to cover all cases.

Report on a Combination Operation for Cataract with Glaucoma. W. L. Hughes. *American Journal of Ophthalmology*, Vol. 48, p. 1. July 1959.

Surgeons differ on the question of dealing with cases of combined cataract and glaucoma. Some prefer to remove the cataract and then do the operation for glaucoma. Others prefer to operate for glaucoma and then perform the catarectomy. Still others have advocated a combination operation for both conditions. A procedure for the removal of cataract in combination with anterior sclerectomy is described.

There are cases in which glaucoma has been under good post-operative control and in which cataract surgery becomes necessary. In these cases there is always the danger that something will interfere with the glaucoma control post-operatively. There are also those cases of cataract that suddenly develop an increase in tension with or without much in the way of symptoms. In these cases a routine operation for the removal of cataract is often done fairly early in the glaucomatous process, especially if the anterior chamber is shallow, in the hope that catarectomy will automatically relieve the increased ten-

sion. It sometimes does; but at other times the anterior chamber angle has been obstructed so long that the glaucoma continues after the lens is removed. It is almost impossible to determine beforehand whether the tension will be relieved or not.

Where there is any question of increased intraocular tension following cataract extraction it is felt that some procedure should be followed to lessen this tendency. The operation described was done in over 60 cases of cataract with various types of glaucoma. Twenty-one cases are discussed. Results show that of the 60 cases all but four had restoration of normal tension without use of miotics postoperatively. No further loss of vision due to continued uncontrolled tension occurred in any case. One eye was lost in this series from a vitreous hemorrhage occurring several weeks after the operation.

Activity of the Oculorotary Muscles During Tonometry and Tonography. W. Kornblueth, A. Jampolsky, E. Tamler and E. Marg. *A.M.A. Archives of Ophthalmology*, Vol. 62, p. 555. October 1959.

Electromyographic studies were performed to show the effect produced on the oculorotary muscles by tonometry and tonography. It was found that holding the tonometer near or on the eye consistently caused a cocontraction of the oculorotary muscles which was simultaneous in both eyes. This reaction was not necessarily accompanied by a contraction of the orbicularis muscles and occurred also after akinesia of the lids.

The occurrence of this response, a so-called protective or fright reaction which is of central origin, was dependent on sight, as it did not occur in blind or nearly blind subjects and in patients under general anesthesia. Tonography showed an initial cocontraction of the oculorotary muscles which diminished progressively over the course of four minutes.

It is suggested moreover that the changes in the tonus of the oculorotary muscles caused by placing a tonometer near or on the eye may alter the intraocular pressure in both eyes and introduce some inaccuracies in tonometry and tonography.

Applanation Tonometry in the Diagnosis and Treatment of Glaucoma. An Evaluation of Decreased Scleral Rigidity. B. Becker and A. J. Gay (with the technical assistance of Miss C. S. Gossin). *A.M.A. Archives of Ophthalmology*, Vol. 62, p. 211, August 1959.

The Schiøtz tonometer, a valuable instrument in routine tonometry, is less reliable in determining intraocular pressure in cases where there is a deviation from the assumed average value for scleral rigidity. High scleral rigidity alone in an otherwise normal eye fortunately seldom results in a mistaken diagnosis of glaucoma. A more serious error occurs in instances of lower than average scleral rigidity. In such cases Schiøtz measurements suggest an intraocular pressure lower than actually exists, and the presence of glaucoma may be overlooked.

Recently a clinically useful applanation tonometer has become available. Due to the exceedingly small amount of intraocular fluid displaced during applanation better estimates of the true intraocular pressure can be obtained directly. When the scleral rigidity coefficient is lower than norm-

al applanation tonometery gives a more adequate evaluation of therapy. This has proved clinically significant in some eyes with myopia, in thyrotropic exophthalmos, after water drinking, and as a consequence of the topical administration of anticholinesterase drugs. Furthermore the comparison of the applanation value with the Schiøtz reading, plotted graphically on the Friedenwald 1955 nomogram, gives a relatively quick and accurate estimate of scleral rigidity.

Alpha-Chymotrypsin. Its Effect on the Rabbit Zonule, Lens Capsule, and Corneal Wound Healing. R. H. Bedrossian. *A.M.A. Archives of Ophthalmology*, Vol. 62, p. 216. August 1959.

The enzyme alpha-chymotrypsin as a zonulytic agent to facilitate intracapsular cataract extraction is discussed. Many questions need to be answered before its use can be recommended in an operative procedure that normally offers a good prognosis. For example, is it selective in action, and are there dangers of increased complications because of its nature or action. The use of eyes of rabbits subjects the drug to a more severe test than in the case of human eyes, since the zonule of these animals is particularly tough. In most of the experiments described rabbit eyes were used; for the initial studies enucleated eyes were used.

It was found that alpha-chymotrypsin sufficiently weakens the zonule in the rabbit eye to permit intracapsular lens extraction without the loss of vitreous. No apparent microscopic changes were seen in the lens capsule or zonular fiber when these structures were incubated in a solution of the enzyme for three hours. This would suggest that the enzyme softens or weakens the zonule without actually dissolving it. Other structures may be affected as well as the zonule and still show no pathologic changes, although no microscopic changes were observed in them. In this respect the action of the enzyme might not be as selective as it seems.

The healing of corneal wounds is not affected when the wounds are bathed in a 1:5,000 solution of the enzyme for 30 minutes. Wound strength is not diminished after 14 days.

Exposure of 000000 chromic absorbable surgical (gut) sutures to a 1:5,000 solution of alpha-chymotrypsin for one hour does not weaken the suture below the strength of suture in the area where the knot is tied. Therefore it is safe to use chromic gut sutures and alpha-chymotrypsin in the same surgical procedure.

Alpha-chymotrypsin appears to cause no immediate adverse sequelae. Additional studies should be made to determine if any delayed deleterious effects may result from its use.

OPHTHALDYNAMOMETRY

A group of Boston physicians reports that a stroke can be diagnosed before it occurs by checking the blood pressure of the eyes. If an obstruction in the internal carotid artery such as a blood clot—a frequent cause of paralytic stroke—is found early enough, it can be removed by surgery or by the use of clot-dissolving drugs.

The October *Pennsylvania Medical Journal* points out that the technique which measures the blood pressure in the eyes, dynamometry, is rapid and safe and becoming increasingly important with the recent advent of more effective treatment of carotid artery insufficiency.

BOOKS AND PAMPHLETS

Education and Health of the Partially Seeing Child. Fourth edition. Winifred Hathaway. Revised by Franklin M. Foote, M.D., Dorothy Bryan and Helen Gibbons. Published for the National Society for the Prevention of Blindness by Columbia University Press, New York. 1959. 204 p. $5.00.

This standard text has been revised to bring it fully up to date. All three of the editors have had the privilege of knowing and working with Mrs. Hathaway who for 24 years was associate director of the National Society for the Prevention of Blindness. All have had years of experience in the education and health of the partially seeing. Dr. Foote is the former executive director of the National Society, and is now state health commissioner for Connecticut; Mrs. Bryan is assistant to the director of the division for exceptional children of the Illinois State Department of Public Instruction; Helen Gibbons is consultant in education for the National Society.

The publication of this edition was made possible by a generous grant from The David Warfield Fund, through the New York Community Trust. It incorporates new material on current educational programs, on meeting needs in rural areas, on visual aids, and long-term guidance.

For the parent of the partially seeing child the book offers invaluable information about diagnostic evaluation, teaching procedures, and the special educational adjustments and aids that are now available. For the school administrator, the nurse and the teacher, it provides a survey of the latest information in their fields, with special emphasis on adapting school facilities for the partially seeing.

Various chapters deal with historical background; defining the child's need; methods of finding the partially seeing in the preschool and school population; school health services; selection and preparation of teachers; educational procedures; community relationships; research, and ultimate goals. The text is well illustrated with photographs, diagrams and charts.

Adventures in American Medicine. G. Canby Robinson, M.D. Published for The Commonwealth Fund by Harvard University Press, Cambridge, Mass. 1957. 338 p. $5.00.

In reviewing half a century of progress in medicine the author, an eminent medical teacher, refers to his good fortune in having his career coincide with what Simon Flexner has called "The Heroic Age of American Medicine". His sense of having participated in an adventure is conveyed as he tells of going to Johns Hopkins School of Medicine when it was just beginning, of interning at Pennsylvania Hospital, of participating in the early development of the Rockefeller Institute and the Washington University School of Medicine, of studying in Germany and working in China. Later he devoted himself to the study of the social aspects of medicine, and demonstrated that sometimes an interest in the patient's life situation and practical assistance can go a long way toward alleviating serious health problems. He pioneered in providing this type of instruction for students.

The book gives the historical background of medical education, research and practice, but it does not purport to be a history. Some of the great names in and connected with medicine pass through its pages.

Some basic principles and present day problems related to adapting the curriculum in medical education to new scientific knowledge and problems of clinical teaching are discussed.

Dr. Robinson is now emeritus lecturer at the Johns Hopkins University School of Medicine.

Worth and Chavasse's Squint. Ninth edition by T. Keith Lyle and G.J.O. Bridgeman. Bailliere, Tindall & Cox, London. Exclusive U. S. agents, Williams & Wilkins Company, Baltimore, Md. 1959. 392 p. $10.00.

Considerable advance has been made in the study of strabismus since the previous edition of this important work was published nine years ago. Thus the greater part of it has been rewritten and rearranged to make the subject matter more concise and easier to understand.

The earlier chapters relating to the development of the binocular reflexes and the various anomalies which may occur due to obstacles operative during or after the developmental period have not been materially altered. Thereafter much new material has been added; and separate sections have been written on the clinical classification, natural history, prognosis and treatment-in-outline of the various types of squint that are encountered in practice.

Final chapters deal with general surgical measures, the incidence of squint and theories of causation.

Preventive Medicine. Edited by Herman E. Hilleboe, M.D., and Granville W. Larimore, M. D. W. B. Saunders Company, Philadelphia. 1959. 732 p. $12.00.

The editors present "a new way to look at preventive medicine" for medical students, general practitioners, specialists and professional workers in official and voluntary health agencies. They distinguish between the prevention of occurrence of disease and disability and the prevention of disease progression. The former is the first goal; the latter is more difficult, more costly and less likely to be successful because damage to the human body is already present.

Much of medicine consists of preventing progression of illness, largely because of procrastination of the individual in seeking medical advice, or because of his tendency to make his own diagnosis and administer home remedies.

The material in this book comes from lectures, seminars and articles by the medical and scientific staff members of the New York State Health Department. Their training and experience cover a broad spectrum of medical service, teaching and research. The main purpose is to outline a practical guide to physicians who are willing to incorporate preventive medicine in their daily practice in office, hospital, home and community. "Such physicians," the editors state, "are more than members of the medical profession; they are specialists in community well being, to whom the oath of Hippocrates means a way of life and not just a way of earning a living."

Part one of the text, dealing with

prevention of occurrence, covers control of environmental factors, prophylactic measures against diseases, proper nutrition, elimination of predisease conditions and preventive dentistry. Part two, on prevention of progression, includes periodic health inventories, early detection of disease, follow-up of screening and diagnostic examination, rehabilitation, alcoholism and narcotic addiction. A third section relates to supporting services for preventive medicine such as health education, social work, public health nursing, the role of the hospital, epidemiologic methods and inferences, official and voluntary health agencies.

The book is distinguished for its excellent typography, clear presentation of material and illustrations.

Dr. Hilleboe is commissioner and Dr. Larimore deputy commissioner of health, State of New York Department of Health.

MEDICAL AND SURGICAL NURSING II. Amy Frances Brown, R.N., B.Ed., M.S. in N., Ph.D. W. B. Saunders Company, Philadelphia. 1959. 852 p. $8.00.

This comprehensive volume is intended to serve as a textbook for the latter two years of study and experience in medical and surgical nursing. Nine units of study are presented including the subjects of non-bacterial and bacterial diseases, medical and surgical emergencies, orthopedics, neurology, skin diseases, gynecology, urology, and diseases of the eye, ear, nose and throat.

The author, who is a graduate of the State University of Iowa School of Nursing and an experienced teacher, has been aided by several authorities in her field including Mrs. Lena Dixon Dietz of Michael Reese Hospital, Chicago, who has contributed a chapter on ophthalmic nursing. This includes sections on preventive ophthalmia, eye emergencies, strabismus, refraction, various disease conditions and treatment.

The text is well documented, profusely and effectively illustrated. It should enable the student to study more effectively and to serve the patient more intelligently.

EDUCATION and HEALTH of the PARTIALLY SEEING CHILD

By WINIFRED HATHAWAY
Revised by FRANKLIN M. FOOTE, M.D., DOROTHY BRYAN, AND HELEN GIBBONS

A new edition of the complete guide for recognizing *partial* loss of vision in children and for helping the partially seeing child to overcome his handicap. This edition includes material on recent educational programs, special needs in rural areas, mechanical devices, and long-term guidance.
Fourth Edition. $5.00

COLUMBIA UNIVERSITY PRESS

MULTILINGUAL DICTIONARY

Lexicon Ophthalmologicum, the multilingual dictionary, was mentioned in these columns recently as a publication of S. Karger, Basel, Switzerland. The book is now also available in the United States, from J. B. Lippincott Company, Philadelphia 5, Penna. The price is $9.00.

Index to Volume XXIX: 1959

SIGHT-SAVING REVIEW

AUTHORS

Alvaro, M. E., Editor. (Bk. Rev.) 3:189
American Ophthalmological Society, Transactions, 1958. (Bk. Rev.) 2:125
Amsler, Marc, Editor. (Bk. Rev.) 3:189
Arrington, George E., Jr. (Bk. Rev.) 3:189
Arruga, H., Editor. (Bk. Rev.) 3:189
Asbury, Taylor. (Bk. Rev.) 1:59
Augur, Helen. 1:8
Bedrossian, E. Howard. (Bk. Rev.) 1:60
Berens, Conrad, Editor. (Bk. Rev.) 1:58
Bickerton, John H., Editor. (Bk. Rev.) 1:58
Bietti, G. B., Editor. (Bk. Rev.) 3:189
Blyth, Robert. (Bk. Rev.) 2:126
Boyce, Virginia S. 3:154
Boyd, Benjamin F., Editor. (Bk. Rev.) 1:59
Brandicourt, R. and S. (Bk. Rev.) 2:128
Bridgeman, G. J. O. (Bk. Rev.) 4:251
Brierley, A. F. M. 3:141
Brown, Amy Frances (Bk. Rev.) 4:252
Brown, George T. 3:138
Bryan, Dorothy, Ed. (Bk. Rev.) 4:250
Cameron, Ian S. (Bk. Rev.) 2:126
Candland, Louise. 1:13
Carlevaro, Gianfranco. (Bk. Rev.) 1:60
Cholden, Louis S. (Bk. Rev.) 1:60
Clark, E. Gurney. (Bk. Rev.) 2:123
Cogan, David G. 2:80
Cohoe, Edith. (Bk. Rev.) 1:62
Cook, Robert. (Bk. Rev.) 1:59
Drake, Alina. 2:85
Duke-Elder, Sir Stewart. (Bk. Rev.) 3:186; (Editor, Bk. Rev.) 3:189
Fennefos, Alpha O. 1:30
Fonda, Donald A. 3:135
Foote, Franklin M., Ed. (Bk. Rev.) 4:250
Free, Mary Louise. 2:92
Galisdorfer, Lorraine. (Bk. Rev.) 3:190
Gellis, Sydney S. 2:80
Gibbons, Helen, Ed. (Bk. Rev.) 4:250
Gorman, John J. 2:80
Gregg, James. (Bk. Rev.) 2:126
Guibor, George P. (Bk. Rev.) 3:187
Hathaway, Winifred. 1:38
Hochbaum, Godfrey M. (Bk. Rev.) 1:62
Holmes, Clark. (Bk. Rev.) 2:126
Irizarry, Jaime E. 4:209
Joliffe, Harry. (Bk. Rev.) 2:126
Knighton, Willis S. 4:232
Leavell, Hugh Rodman. (Bk. Rev.) 2:123
Lebensohn, James E. 4:204
Lyle, T. Keith, (Bk. Rev.) 4:251
MacNalty, Sir Arthur (Bk. Rev.) 2:124
McCaslin, Murray F. 1:4
Menzin, A. William. 3:149
Mills, Grace E. 3:144
Miranda, Manuel N. 4:209
Morales, Carlos E. 4:209
Nelson, Florence. 2:70; 4:222
Newell, Frank, Editor. (Bk. Rev.) 3:188
Ouillon, Honore. (Bk. Rev.) 1:60
Onfray, Rene. (Bk. Rev.) 2:126
Ophthalmological Society of Egypt, Acta, 1958. (Bk. Rev.) 2:127
Park, George E. 4:213
Parkinson, Roy H. (Bk. Rev.) 3:190
Picó, Guillermo. 4:209
Price, David E. 2:76
Quereau, J. Van Dyke. 1:20
Robinson, G. Canby (Bk. Rev.) 4:250
Ryan, Ralph W. 2:88
Schade, Julia. 4:226
Shepard, Mary Estelle. (Bk. Rev.) 3:190
Sheppard, L. B., Editor. (Bk. Rev.) 1:58
Stallard, H. B. (Bk. Rev.) 2:124
Thompson, Mary A. 1:16
Turner, C. E. (Bk. Rev.) 2:127
U. S. Department of Defense. (Bk. Rev.) 1:58
U. S. Department of Health, Education, and Welfare. (Bk. Rev.) 3:187
Vail, Derrick, Editor. (Bk. Rev.) 2:125; (Bk. Rev.) 3:187
Vaughan, Daniel. (Bk. Rev.) 1:59
Wallace, Helen M. 3:160
Zimand, Savel, Editor. (Bk. Rev.) 1:61
Veirs, Everett R. (Bk. Rev.) 2:123
von Werssowetz, Arthur J. 4:230
Whittington, Theodore H. (Bk. Rev.) 2:126

SUBJECTS

CAUSES OF BLINDNESS

Blind Children in California. 3:150
Blindness Study. 1:35
Blindness Survey (Israel). 2:107
Causes of Blindness in Puerto Rico. Guillermo Picó, Manuel N. Miranda, Jaime E. Irizarry and Carlos E. Morales. 4:209
Eye Health of School Children (Great Britain). 2:106
Abstracts. 2:110; 3:181

COLOR VISION

Color Vision. 4:197

CONFERENCES

Asia-Pacific Academy of Ophthalmology. 2:100
1959 Annual Conference Stresses Sight-Saving Goals. Florence Nelson. 2:70
1960 NSPB Conference. 3:134
Pan-American Congress (Caracas, Venezuela, 1960). 2:100; 3:171
Post Pan-American Congress Meeting in New York. 3:175
White House Conference. 4:203

COURSES

AAOO Home Study Courses. 1:63
Pittsburgh Summer Courses. 3:191

Postgraduate Courses. 1:26
Summer Courses (1959). 1:33; (1960). 4:239

CULTS, MISCONCEPTIONS, FALSE CLAIMS

Arrest on Fraud Charges. 1:26
Duke-Elder on Eye Exercises. 1:22
It Can't Be Done. 2:79
Two Firms Restrained. 1:34

DEATHS

Moacyr E. Alvaro, M.D. 3:173
Elliott S. Nichols. 2:105
Bernard Samuels, M.D. 3:173
Manuel Troncoso, M.D. 1:26
Felix J. Underwood, M.D. 2:105

DRIVERS' VISION

Drivers' Health Study. 3:159
Seeing Habits for Drivers. 1:28
Visual Fields and Traffic Safety. 1:29
Visual Requirements for Drivers. 3:152
Abstract. 1:57

DRUGS

(The) Drug Counter. 1:42
Investigate New Drug. (Alpha chymotrypsin). 3:153
Newborn Still Need Protection. 1:23
Risks in Modern Drugs. 1:21
Wonder Drug, Old Style. 1:24
Abstracts. 1:49, 57; 2:117, 121; 4:249

EDUCATION—MEDICAL

Faculty Shortage. 1:34

EDUCATION OF THE PARTIALLY SEEING

Alabama Lions Active. 3:167
APHA Discussions of Eye Problems. 2:96
Blueprints for Special Education (Japan). 3:175
Coordinating Educational Services for the Partially Seeing Child. Panel Discussion. 4:235
Delta Gamma Scholarship Winners Enthusiastic. 2:95
Fields of Work for the Partially Seeing. Alpha O. Fennefos. 1:30
How Regular Teachers Can Aid Visually Handicapped. 1:19
New Edition of Hathaway Text. 2:103
Pittsburgh Summer Course. 3:191
Reading Guide for the Partially Seeing. 3:159
School Services for Partially Seeing and Blind Children in Urban Areas. Helen M. Wallace. 3:160
Segregation of Visually Handicapped (Russia). 1:40
Special Teachers Wanted. 2:104
Summer Courses 1959. 1:33
Winifred Hathaway Award. 2:103; 4:219
Workshop in Texas. 2:102
Abstract. 1:53

EYE BANKS

See Sight Restoration

EYE DISEASES AND DEFECTS

Amaurosis Congenita
Abstract. 2:112

Amblyopia
No Substitute for Early Treatment in Strabismus and Amblyopia. 3:151
Abstracts. 1:51; 2:111

Anisometropia
Abstract. 2:121

Cataract
(A) Report on Cataracts (Penna.). 4:218
Study Lens Proteins. 2:75
Abstracts. 1:44; 2:114, 115, 116, 117

Chorioretinitis
Abstract. 1:45

Cornea
Abstract. 2:121

Corneal Ulcers
Abstract. 1:47

Diabetic Disorders
Abstracts. 1:46; 2:119, 120

Glaucoma
Fort Lee Project. 1:27
Free Testing Center (Pasadena). 1:27
G-Day in Montana. 1:27
Glaucoma Clinics Multiply. 3:167
Glaucoma Exhibit on Loan (San Mateo County Medical Society). 1:27
Glaucoma Identification Card. 2:91
Glaucoma Screening in Allegheny County. Murray F. McCaslin. 1:4
Glaucoma Screening in Chattanooga. Arthur J. von Werssowetz. 4:230
Glaucoma Screening in Connecticut. Grace E. Mills. 3:144
Health Department Follow-up in Glaucoma. A. William Menzin. 3:149
NSPB at Brawley Fair. 3:169
News of Glaucoma Screening. 1:27
Program of Washington Society. 4:234
Progress in Glaucoma Control. Willis S. Knighton. 4:232
Rural Kansans Screened. 3:168
Schoenberg Lecture (1958). 1:63
Tonometers Need Watching. 1:22
Tonometry in Glaucoma Surveys. 2:91
World War on Glaucoma. 4:208
Abstracts. 1:45; 2:118, 119; 3:176, 177, 184; 4:246, 247, 248

Herpes Simplex Keratitis
Abstract. 3:177

Macular Degeneration
Abstracts. 1:47; 2:121

Myopia
Abstracts. 1:54; 3:183

Ophthalmia Neonatorum
Newborn Still Need Protection. 1:23
Prophylaxis Test. 4:239
Abstract. 2:109

Ptosis
Abstract. 1:52

Regional Distribution of Eye Disease
Abstract. 3:178
Retinal Detachment
Abstract. 1:46; 4:245
Retinal Hemorrhage
Abstract. 1:44
Retinitis
Abstract. 3:178
Retinoblastoma
Abstract. 1:43
Retrolental Fibroplasia
Problems of Prematures. 1:24
RLF in Oregon. 3:170
Abstracts. 1:43, 44; 2:109, 110; 4:245
Strabismus
No Substitute for Early Treatment in Strabismus and Amblyopia. 3:151
Abstract. 2:111
Toxoplasmosis
Abstract. 1:45
Trachoma
Hope for Trachoma Vaccine. 2:101
Trachoma Documentary. 4:212
Trachoma Fought on Coast (Spain). 3:175
Trachoma Fought on Wide Front (South Africa). 2:108
Trachoma Survey in Australasia. 1:39
War on Trachoma (Taiwan). 1:41
Abstract. 1:48
Tumors
Schoenberg Lecture (1959). 3:148
Abstract. 1:55
Uveitis
Research in Uveitis. 3:143
Abstract. 3:178

EYE EXAMINATION—MEDICAL
Doctors Recommend Safeguards. 1:28
Please Return the Eye to the Body. J. Van Dyke Quereau. 1:20
Abstracts. 1:50; 3:182, 184

EYE INJURIES
Boxing is Taboo. 1:63
Effects of Atomic Flash. 1:42
Eye Care in Philadelphia. 3:168
Eye Damage in Skin Diving. 2:101
Gaps in Fireworks Control. Helen Augur. 18:
Official Condemns Boxing. 1:35
Safety Lenses Urged. 1:34
St. Louis Bans Toy Guns. 2:96
Abstracts. 1:49, 50, 55; 2:113, 114, 120

EYE PHYSIOLOGY
Darwin on the Eye. James E. Lebensohn. 4:204
Eyes in the Animal World. 2:99
The Retina in Color TV. 3:148

FATIGUE FACTORS
Abstract. 1:51

HEALTH—GENERAL
Doctors and Welfare. 1:35
Health Forum Popular. 1:35
Medical Aid Increased. 1:21
Oldsters' Insurance. 1:34
Prepaid Medical Fees. 1:15
One Big Health Agency? 2:98
Three Agencies Join National Health Council. 2:75
TV Vindicated (Great Britain). 2:106

ILLUMINATION
Researches in Seeing. 1:7
Abstracts. 1:56; 3:181

INDUSTRY
Accidents Mount in Building Industry (Netherlands). 1:39
(The) Industrial Nurse and the Vision Program. Louise Candland. 1:13
Industrial Vision Conservation—The Physician's Viewpoint. Ralph W. Ryan. 2:88
New Industrial Film. 4:242
Organized Labor's Prescription for Industrial Vision Conservation. G. T. Brown. 3:138

LEGISLATION
Gaps in Fireworks Control. Helen Augur. 1:8
Medical Aid Increased. 1:21

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS
Enos Curtin President NSPB. 4:220
Franklin M. Foote, M.D., Becomes Connecticut Health Commissioner. 3:134
From the NSPB Mailbag. 2:128
John W. Ferree, M.D., Named New Director of NSPB. 3:133
News of the Colorado Chapter. 4:225
1959 Annual Conference Stresses Sight-Saving Goals. Florence Nelson. 2:70

NEUROLOGY
Appointment of Dr. Bailey. 3:170
Abstract. 1:56

NEW TECHNIQUES
Diagnosis by Machine. 2:84
(The) Retina in Color TV. 3:148
Abstracts. 1:55, 56

NURSING
(The) Industrial Nurse and the Vision Program. Louise Candland. 1:15

OPHTHALMOLOGY
Alabama Lions Active. 3:167
Army Eye Clinic. 2:104
Conan Doyle, Eye Specialist. 3:191
Fellowships Offered. 1:26
Guild Fellowships. 3:171
In the Service of Sight: William Lemuel Benedict, M.D. 4:222
Infirmary Thrives (Massachusetts Eye and Ear). 3:166
M.D.'s and Socialized Medicine (Great Britain). 3:174
Mobile Medicine (India). 3:174
Polynesian Pattern (New Zealand). 1:40
Postgraduate Courses. 1:26
Abstract. 2:113

OPTICAL AIDS

Contact Lens Technicians Certified. 1:15
Lighthouse Extends Services. 2:95
Optical Aids Clinic. 4:242
Risks in Cheap Glasses. 2:99
Rules for Sun Glasses. 2:108
Safety Lenses Urged. 1:34
Use of Tinted Lenses in Night Driving. 4:240
Value of Contact Lenses. D. A. Fonda. 3:135
Virginia Expands Services. 2:101
Abstracts. 1:47; 3:179

PERCEPTION

(The) Subjective Element in Perception. A. F. M. Brierley. 3:141
Deceiving the Eye. 2:104
Abstract. 3:180

PREVENTION OF BLINDNESS PROGRAMS

Goals and Problems in Saving Sight. David E. Price. 2:76
1959 Annual Conference Stresses Sight-Saving Goals. Florence Nelson. 2:70
POB in Bengal (India). 2:106
POB in Florida. 1:37
Preventive Program (South Korea). 1:40
(The) Prevention of Blindness Program—Its Objectives and Scope. Virginia S. Boyce. 3:154
Secretary Urges Blindness Prevention (Philippines). 2:107
Sight-Saving Month. 4:241
Society Founded (Bolivia). 2:106
Abstract. 1:50

READING

Medical Aspects of Reading Failures in Intelligent Children. George E. Park. 4:213
Reading Guide for the Partially Seeing. 3:159
Abstract. 3:181

RESEARCH

Broad Research Plan (Australia). 1:39
International Medical Research. 1:25
NSPB Research Grants. 1:42
Researches in Seeing. 1:7
Serendipity. 2:98

SIGHT RESTORATION

Eye-Bank Expands. 2:100
Grants to Rochester Laboratory. 3:175
Lions Promote Eye Bank. 1:36
Louisville Eye Bank. 4:229
Operation of the Illinois Eye Bank. Alina Drake. 2:85
Report on Sight Conservation Society of Northeastern New York. 3:167
Slogan for Eye Bank. 3:191
Abstracts. 1:48; 3:185

STANDARDS

Armed Services Ease Visual Standards. 2:75
Contact Lens Technicians Certified. 1:15
Dispensing by Physicians. 1:15
Rules for Sun Glasses. 2:108
Visual Requirements for Drivers. 3:152
Abstracts. 1:53; 2:122

TRIBUTES AND AWARDS

Award to Dr. Blake. 2:97
Dr. Goldmann Honored. 4:241
Dr. Wald Wins Award. 1:35
Homer Folks Honored. 3:170
Leslie Dana Medal Awarded to Robert F. Irwin, Jr. 2:74
Medal to Dr. Rand. 3:166
Tribute to Dr. Cordes. 4:212
Tribute to Jean S. Robinson. 3:172

VISION—CORTICOGENIC

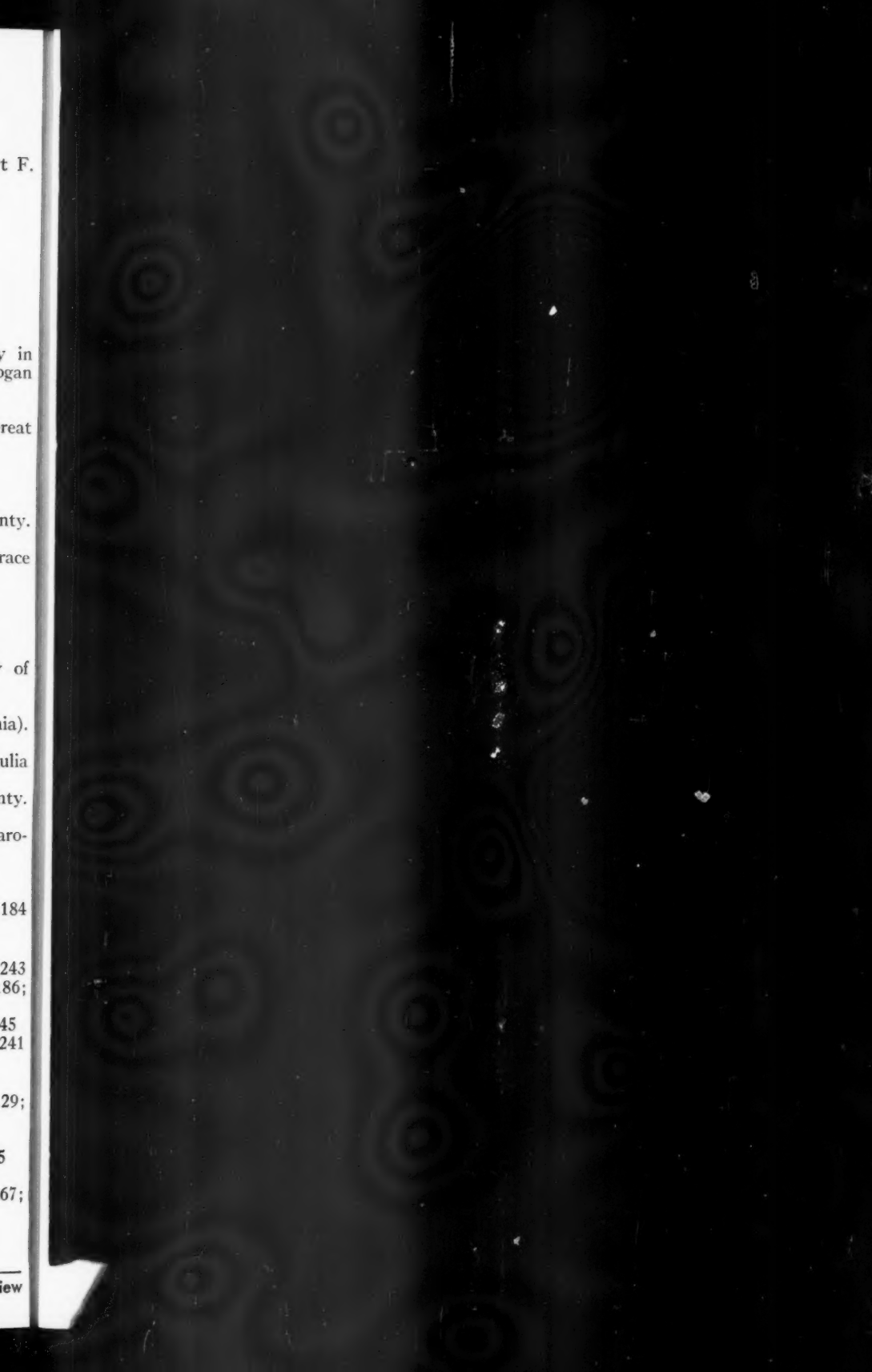
Abstract. 3:183

VISION TESTS

Buttons for Preschoolers. 1:38
(A) Device for Testing Visual Acuity in Infants. John J. Gorman, David G. Cogan and Sydney S. Gellis. 2:80
Eye Care in Philadelphia. 3:168
Eye Health of School Children (Great Britain). 2:106
Eye Tests for Children. 3:180
Follow-up of Vision Defects. 1:36
Glaucoma Clinics Multiply. 3:167
Glaucoma Screening in Allegheny County. Murray F. McCaslin. 1:4
Glaucoma Screening in Connecticut. Grace E. Mills. 3:144
Jaycees Cooperate. 2:84
Los Angeles School Health. 1:36
Milwaukee Clinic. 2:102
News of Glaucoma Screening. 1:27
Report on Sight Conservation Society of Northeastern N. Y. 3:167
Rural Kansans Screened. 3:168
Screening in Butler County (Pennsylvania). 1:33
Vision Screening in a Children's Clinic. Julia Schade. 4:226
Vision Screening in Prince George's County. Mary A. Thompson. 1:16
Volunteer Vision Screening in South Carolina. Mary Louise Free. 2:92
Volunteers Help Screening. 1:36
Workshop in Texas. 2:102
Abstracts. 1:53, 54; 2:112, 122; 3:180, 182, 184

DEPARTMENTS

Around the World. 1:39; 2:106; 3:174; 4:243
Books and Pamphlets. 1:58; 2:123; 3:186; 4:250
Current Articles. 1:43; 2:109; 3:176; 4:245
Notes and Comment. 1:34; 2:100; 3:174; 4:241

ADVERTISERS

American Optical Company. 1:1; 2:65; 3:129; 4:193
Columbia University Press. 4:252
Excerpta Medica. 1:64; 2:68; 3:192; 4:195
Good-Lite Mfg. Co. 1:2; 2:66
Jenkel-Davidson Optical Company. 2:67; 3:131; 4:194
Syracuse University. 1:61; 4:240
Titmus Optical Company, Inc. 3:130